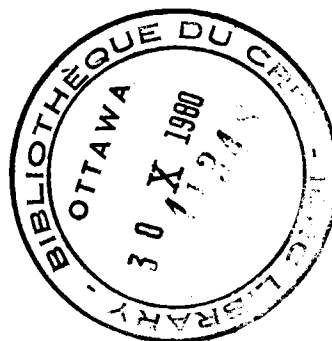


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**The Concept**  
of a  
**Management Information System**  
for the  
**International Centre for Agricultural**  
**Research in Dry Areas**  
**(ICARDA)**

IDRC - doc - 198



THE CONCEPT  
OF A  
MANAGEMENT INFORMATION SYSTEM  
FOR THE  
INTERNATIONAL CENTRE FOR AGRICULTURAL RESEARCH  
IN DRY AREAS  
(ICARDA)

by R.S. Audebert  
E.M. Zengbe  
C.L. K. K. K.

1980

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### P.S. Ross and Partners

An Examination of Management Accounting and Reporting Practices and Computing Capabilities at the International Agricultural Research Centers.

### Consultative Group on International Agricultural Research

Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers.

## INTRODUCTION

## INTRODUCTION

The International Centre for Agricultural Research in the Dry Areas (ICARDA) has been created under the auspices of the Consultative Group on International Agricultural Research. As a result ICARDA's establishment and operations will be funded by a number of national and international agencies whose role is to support research and development on a global basis. The complexities of ICARDA's intended research activities, the environment in which it will operate, and its relationships with its funding agencies are such that an adequate system of financial management is an essential feature of administration.

To expedite the formation of ICARDA, the International Development Research Centre (IDRC) was designated as Executing Agency. In accepting this mandate, the IDRC recognized, as one of its responsibilities, the requirement to assist the Board of Trustees in ensuring the establishment of a management accounting and budgetary system consistent with both the immediate and future requirements of ICARDA.

Towards this end this paper presents a series of guidelines which, it is hoped, may assist the Board in establishing its own management procedures. The suggestions proposed herein discuss ICARDA's philosophy of financial management, the organizational requirements the information needs and resultant reports, budgetary considerations and financial policies. The accounting and budgeting system proposed is designed to be compatible with both initial manual recording and reporting procedures as well as more sophisticated mechanized systems which no doubt will be implemented in the near future. Thus, both the system and the process of implementation are tailored to the unique characteristics of ICARDA.

Unfortunately, IDRC has not had an opportunity to undertake an on-site review and analysis of the financial and administrative requirements facing ICARDA. The proposals submitted herein are therefore based on IDRC's own experiences, combined with observations of the practices followed and problems faced by other International Research Centres. It is emphasized, therefore, that such of these proposals as may be deemed appropriate to ICARDA's requirements may need to be modified to meet local exigencies.

## MANAGEMENT PHILOSOPHY

## MANAGEMENT PHILOSOPHY

A review of the development of research organizations will usually reveal that a common element which requires particular attention is the relationship between scientific research personnel and the administrative functions of such an organization. Experience indicates that it is relatively easy to lose sight of the perspective that research is the prime raison d'être of a research organization, and that the function of the administrative infrastructure and particularly the Comptroller's Office is intrinsically that of supporting the research effort. Too often, the financial administration is regarded, and regards itself, as a policing agency whose objective is, by means of financial controls and restrictive regulations, to monitor and control the activities of the operating research divisions.

We would propose a more fruitful alternative to this relationship is to consider the total activity of ICARDA as a "team effort", all endeavours being construed as support for operational research, towards definable research objectives. In this context, the infrastructure implemented to provide financial and management information is properly seen as an effective



management tool, to be used by the scientific research professionals in co-operation with their counterpart administrative team members.

It is considered that an organizational relationship based on these premises will not only enhance the operating effectiveness of the total effort, but will ensure a continued capability to provide services and information consistent with the requirements of, not only ICARDA, but of the Consultative Group as well.

It is to be noted that ICARDA is the most recently established unit in an extensive network of International Agricultural Research Centres. As such, it will undoubtedly be influenced by the organizational and administrative features of its sister organizations. The following excerpts from a report prepared for IDRC by P.S. Ross and Partners, management consultants, summarize the current organizational structure of the existing CGIAR supported research centres. A copy of the full P.S. Ross and Partners Report is attached as part of the appendices to be reviewed at the reader's convenience. It should be noted that there is a conspicuous absence of a "team approach" which might explain the reason for the following comments:

"Programme leaders, managers of support services and auxiliary service operations are becoming increasingly concerned with the management of their costs and their demands for financial information are increasing. Already, several requests for additional information have been expressed. These range from the elementary request of a budget centre wishing to know the extent of budget dollars remaining after deduction of actual expenditures and outstanding purchases to the more complex reporting requirements of a program leader or Center Director searching for the total actual plus committed expenditures of a research thrust crossing several budget centres. These internal requests for management and financial information are not being satisfied fully by existing cost collection and reporting systems and managers and program leaders are depending on private reporting systems to meet their needs. These information demands will expand and must be satisfied. In the majority of cases they remain unsatisfied not from a lack of desire to provide the information but rather from the inability of the system to meet these requests."

## STRUCTURE OF THE COMPTROLLER'S OFFICE

## STRUCTURE OF THE COMPTROLLER'S OFFICE

The following discussion is offered as an aid in establishing an administrative structure capable of adequately serving ICARDA's information requirements. The requirement to operate research stations in three national jurisdictions renders ICARDA's role unique among the existing international research Centres. It will undoubtedly prove administratively challenging. It will also certainly be more costly in terms of administrative infrastructure compared with other Centres.

A high priority should be assigned to the placement of a professionally qualified Comptroller as soon as possible after ICARDA is formally established. This individual should be selected by and be directly responsible to the Director General. The clerical functions of the Comptroller's Office would be undertaken by support personnel whose numbers would be determined through consultation between the Director General and the Comptroller.

Although much stress will be put on the concept of a "team effort" in this paper, it must be appreciated that some form of definite financial guidance is required. In consequence, the Comptroller must be delegated sufficient authority to command the respect of both his staff as well as that of ICARDA's scientific research professionals.

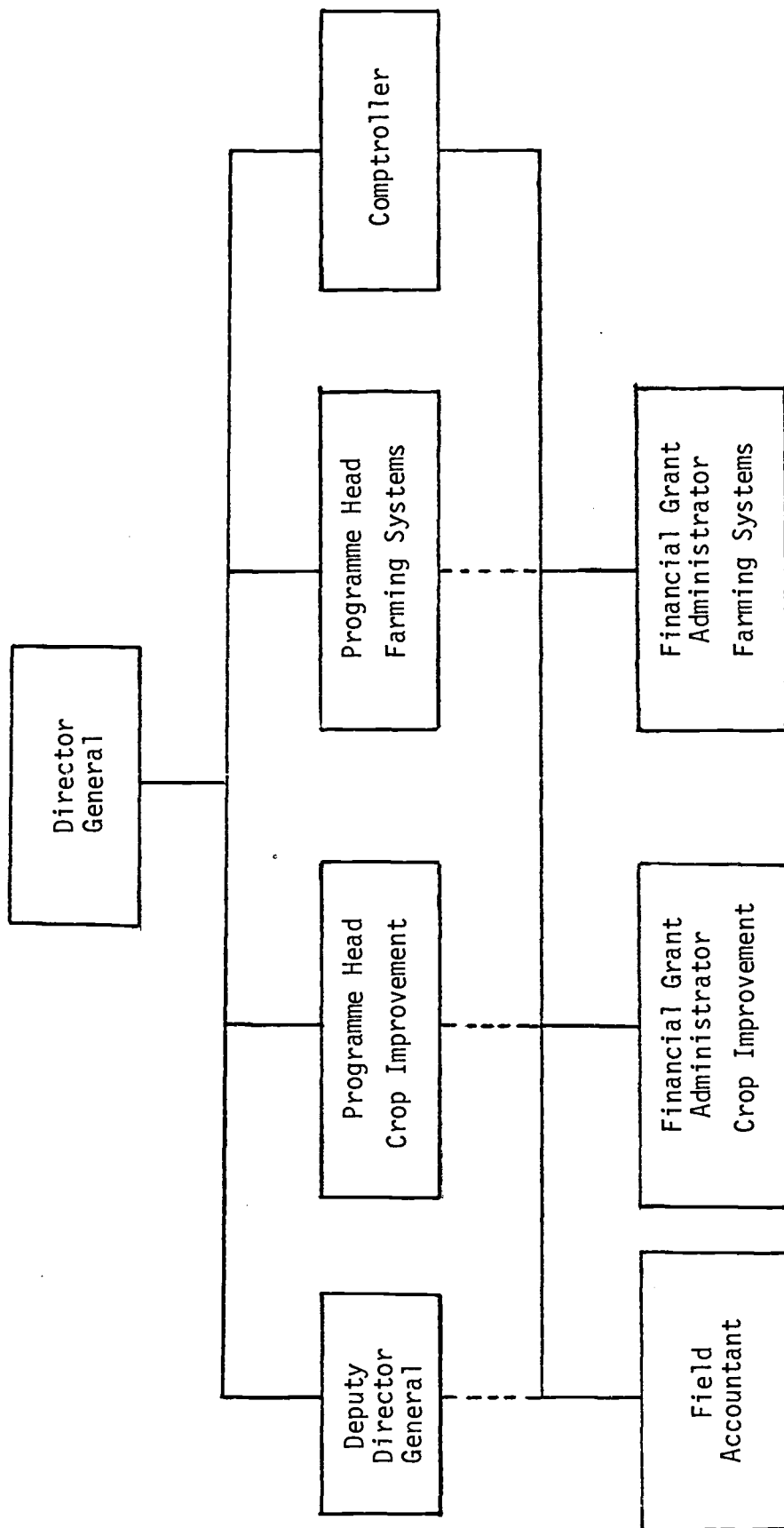
We would strongly recommend that a qualified individual be assigned to each major programme to be located wherever the main research activity is situated to act as a "financial grant administrator". The role of this person would be to work with the Programme Director in preparing the Programme budget, and to advise him on financial matters pertaining to his Programme. It should be noted that implementation of this particular recommendation will be dependent on the rate of progress of ICARDA'S scientific endeavours.

Among the advantages of such an arrangement is that costs will be allocated between Programmes in a fashion which is compatible with the accounting system, and that the budget and accounting functions are performed in a consistent manner. It also involves

both the Accounting and Research personnel directly in the budgetary process thus illustrating the "team approach". Although responsibility for Programme expenditures rests with the Programme Director, his close association with the financial grant administrator assures an essential degree of Programme control.

We would also propose that the Comptroller be supported by a professional accountant at each research station. The responsibilities of the "field accountant" would include the processing of local invoices for payment, station payroll, maintaining a monthly register of receipts and disbursements, preparing the station's administrative budget input, and advising the Deputy Director General on financial matters. The station accountant would be responsible to the Deputy Director General as well as the Comptroller. To be effective, this arrangement depends on close cooperation, reflecting the "team spirit" alluded to previously. This approach has been implemented at CIMMYT with most satisfactory results to-date. Attached is a visual presentation of the basic structure and relationship involving the Comptroller's Office.

Initially it is visualized that all accounting activity will be centralized at ICARDA's Headquarters, at least until the establishment of operations at the principal research station level. In due course, as the field activity gathers momentum, ICARDA's management should consider delegating this responsibility to the regional level by way of developing complete and compatible accounting systems at each principal research station. At such time the functions of the Comptroller's Office would revolve around consolidation, interpretation, and internal control of the Centre's financial operations as a whole.





INTERNAL AND EXTERNAL REPORTING REQUIREMENTS

## INTERNAL AND EXTERNAL REPORTING REQUIREMENTS

An effective system of reporting is essential to the efficient management of ICARDA. Such a system must also provide the information that may be required by the Consultative Group and other donor agencies. Receipts, expenditures and budget balances must be quickly and accurately reflected by the accounting system, by programme, and by category of expenditure. The effectiveness of any such system, however well designed, will depend, to a large extent, upon the degree of cooperation developed between the financial staff and the research personnel. The overall conduct of affairs must be regarded as a team effort.

### Programme vs Discipline Basis

In order that ICARDA's management obtain useful operating information, we propose that the accounting records be maintained on a programme rather than a discipline basis. In the context of this report, the term "programme" is used in the sense intended in the Consultative Group's Budget and Accounting Procedures and Practices. In that paper, a programme is defined as a set of

organized activities designed to progress toward defined objectives. It is understood that two of the major activities contemplated for ICARDA's research efforts are entitled "Crop Improvement" and "Farming Systems" both of which are considered to conform to the preceding "programme" definition.

This approach is now being followed by some of the existing CGIAR supported research centres, but it has been the result of a process of evolution. In the case of ICARDA, the opportunity exists to utilize this approach from its inception. Advantages of this approach include a coordination between the various disciplines involved, the possibility of preparing budgets for complete research programmes rather than by departmental divisions, and the opportunity to relate budget and reporting information to research functions and objectives.

#### Direct Costs

Inherent in this approach is a policy that expenditures should be charged directly to research programmes whenever they can be defined or identified. This approach will ensure accuracy of the

records, will facilitate the preparation of meaningful reports, will aid in determining the accountability of responsibility centres, and will provide an effective measure of control over programme costs.

An effort should always be made to charge costs directly.  
As an example it is common procedure to charge the costs of transportation to a Motor Pool which then becomes part of the Centre's general overhead. It would be more accurate to charge to a particular research programme the cost of transportation employed in support of that programme. One example of handling such expenditures, developed at CIMMYT, is to assign the vehicles to research programmes, in the same manner in which personnel are allocated, and then to charge all operating, maintenance and repair costs associated with a particular vehicle to the programme to which it has been assigned.

We would also suggest that administrative costs be identified as an independent responsibility centre. Otherwise such costs would be hidden if one were to allocate such costs over every research programme. For example, we believe it is incorrect for the Comptroller's travel costs to be charged to a

*Charge everything to the budget which  
the budget leader calls for, and  
employs and controls.*

research programme irrespective of the fact that the purpose of the travel may be related to financial or administrative aspects of that programme.

#### Commitment Reporting

Obligations should be recognized at the time they are formally incurred. Commitments will consist of a mixture of obligations, represented by outstanding purchase orders, contractual undertakings, and the balance of annualized costs such as salaries. Under a manual accounting system, this will present obvious difficulties in obtaining a record of all commitments outstanding at any one point in time. During this period the outstanding purchase orders could be filed separately awaiting payment while the annualized costs could be calculated manually. When it becomes necessary to convert to a mechanical operation, it should be possible to programme a system that recognizes all purchase orders and contractual obligations, and at the same time annualizes recurring costs.

### Annual Budget

The annual budget should be constructed in terms of ~~or project~~ programmes, and by categories of expenditure within programmes. If monthly expenditures are presented in the same terms, the relationship between actual performance and budgetary objectives will be readily apparent, and variances will be clearly highlighted. The role and formulation of the budget will be considered in detail in a subsequent section of this paper.

### Internal Reports

It is considered that there are a minimum of three monthly reports of major significance to the financial management of ICARDA. These include the Balance Sheet, the Statement of Income and Expenditure, and a Management Report analyzing expenditures for the months and for the fiscal period to date.

The Balance Sheet and Statement of Income and Expenditure should be presented in a conventional accounting format, modified to meet local requirements. In addition, it would be convenient if they were also prepared in conformity with the reporting requirements of the Consultative Group.

Although the immediate objective of ICARDA's Budget activities is to quantify and secure both approval and funding of the Centre's proposed programmes for the year, it has an important and continuous role in support of the management function during the fiscal year. To be effective in this role, however, it must be supplemented by accurate and timely reports of actual performance over the budget period. This information will continue to be provided through the medium of a monthly Management Report issued by the Comptroller's Office. A comparison between the results reported in the Management Report and the objectives set forth in the budget will give an effective measure of programme management, and provide the basis for further analysis of problem areas. When considered desirable or helpful the Management Report could be supplemented by more detailed reports analysing the more significant differences between performance and objectives.

It follows from the preceding that the Management Report should thus be designed to show expenditures by programme, location, and by object of expenditure. In formulating the Management Reports attached at the end of this section, IDRC faced the same problems which will confront ICARDA's Management. One of these involves the degree of detail which should be reported for management

purposes. It is inevitable that some degree of grouping of expenditures will be required. No doubt both ICARDA's Director General and Comptroller may wish to revise the suggested grouping and report formats in light of the future administrative policies of ICARDA.

Schedule I is an example of the report which is suggested for each of the programme "leaders" assigned to the principal research station operations. Schedule II reflects a format for a Deputy Director General which will summarize the financial status of administrative services under his responsibility. Schedule III summarizes expenditures by the main organizational responsibility centres while Schedule IV reflects the same information but in terms of main expense categories. This format would be of interest to both the Director General as well as both Programme heads and Deputy Director Generals responsible for each of the principal research programmes and station operations.

It is likely that further reports will be found necessary or desirable in certain circumstances. The design of the accounting system contemplated herein should make such reports relatively simple to prepare. However, given an initial manual system, the constraints imposed by the workload would necessarily require careful consideration in the decision to introduce additional reports.



### External Reports

Probably the most important of ICARDA's external reporting requirements involves the provision of certain information to the Consultative Group. The format for these reports is fixed, and is illustrated in the "Budgeting and Accounting Procedures and Practices of International Agricultural Research Centres" included as an appendix to this paper. These reports are required to be submitted to the Consultative Group on a predetermined cycle of events. The draft budget and final budget submissions approved by the Board of Trustees are required by March 31 and June 30 respectively of each year. This information is reviewed during the annual "Centres week" with formal pledging of donor contributions in the fall of each year. ICARDA could thus expect to receive its 1977 operating funds directly from individual donors during that calendar year.

The management of special projects will involve special reporting requirements to satisfy the information needs of donor agencies who have undertaken the funding of the project. In these cases, the decision to charge expenditures directly to the project and to allocate costs where possible, simplifies the preparation of the relevant reports. It is expected that the proposed accounting system will provide the basic tools with which to meet these requirements.

Finally it is possible that certain national agencies of the host countries of ICARDA's operations may request certain financial reports. In this case, the format and content would likely be established by the agency in question, and ICARDA would be expected to respond to such requirements. It is anticipated that the system of accounts and operating procedures discussed herein would render that response accurate, complete, and timely.

## CROP IMPROVEMENT PROGRAMME

IRAN

Management Report  
For the period ended

	Actual Expenditures		<u>Total</u>	<u>Approved Budget</u>	<u>Balance</u>
	<u>Month</u>	<u>Year</u>			
Personnel Costs					
Salaries and Benefits					
Allowances					
Field Operations					
Genetic Material					
General Supplies					
Field Labour					
Operating Costs					
- Equipment					
Laboratory Costs					
Travel and Relocation					
Training					
Conferences and Workshops					
Publications					

SECRET

ADMINISTRATION SERVICES

IRAN

Management Report  
For the period ended

Actual Expenditures		Encumbrances	Total	Approved Budget	Balance
Month	Year				

Personnel Costs

Salaries and Benefits  
Allowances

Office Operations

Rent and Utilities

Supplies

Travel

Insurance

Training

Taxes

Secretarial

Communications

ICARDA

Management Report  
For the period ended

	Actual Expenditures		Encumbrances	Total	Approved Budget	Balance
	Month	Year				
Crop Improvement						
Crop Improvement						
Crop Protection						
Farming Systems						
Soil-Plant-Water						
Animal Protection						
Agricultural, Economic and Rural Sociology						
Special Projects						
Research Support Units						
Library						
Information Services						
Common Laboratory						
Services						
Statistics and						
Computational						
Laboratory						
General Administration						
Board of Trustees						
Director General						
Accounting						
Purchasing						
Personnel						

ICARDA

Management Report  
For the period ended

	Actual Expenditures		<u>Encumbrances</u>	<u>Total</u>	<u>Approved Budget</u>	<u>Balance</u>
	<u>Month</u>	<u>Year</u>				
Salaries and Benefits						
Regular						
Overtime						
Living Allowances						
Rental						
Utilities						
Equipment Operation						
Vehicle Maintenance						
Vehicle Repair						
Site Operations						
Daily Labour						
General Supplies						
Maintenance						
Buildings						
Offices						
Publications						
Printing						
Postage						
Periodicals						
Office Operations						
Rent and Utilities						
Supplies						
Travel						
Insurance						
Training						
Taxes						
Training and Workshops						

## BUDGETARY SYSTEM

## PROPOSED BUDGETARY SYSTEM

### Introduction

In the language of modern business organizations, the budget can be described as the statement of the operational plans of the concern expressed in financial terms. In the Consultative Group environment, the annual budget will perform four main functions. The first is the determination of the financial and other resources required to achieve the technical objectives assigned to ICARDA's research programmes. The second is to provide the information, in sufficient detail, required to secure approval of the research programs by ICARDA's Board of Trustees and the Consultative Group. The third is to provide the means to manage, monitor, and operate under financial guidelines for a specific time period. Finally, ICARDA's budget will provide a measure whereby the performance anticipated in the operational plans can be assessed.

Looked at another way it can be said the budget has both an internal and, an external function. Internally, it assists management in planning and controlling its programmes



while externally it will form the basis of ICARDA's annual request to the CGIAR for operating and capital funding.

### Budget Philosophy

An effective budget should possess the following capabilities. It serves as a guide by which operations may be directed, as a measure of control over operational effectiveness, and as a method of evaluating performance. When a budget performs these functions effectively, it can serve as a powerful management tool.

The formulation of ICARDA's programme objectives will be a function of research management. Programme objectives should be established by the Director General in consultation with his operational staff. It follows that the translation of the research programmes into budgetary terms will also be the responsibility of programme managers. The programmes will then be quantified by object of expenditure with the assistance of the Comptroller's staff and in particular the Financial Grant Administrators.

The advantages of expressing the budget in terms of programmes are important. It enables the organization to define its operational goals, and provides a chart by which those goals might be realized. It also provides a method by which the achievement towards reaching set objectives goals may be evaluated.

The budget should therefore establish the Centre's operational objectives and indicate how those objectives are expected to be achieved. This involves, besides monetary targets, a detailed narrative description of programme objectives. It will be apparent that, under this concept, a budget is much more than a vehicle with which to support a request for a grant of funds. More importantly, it should be used throughout the year to evaluate both the technical and financial status of operations.

The relationship of the Comptroller's Office to the operating programmes is that of a staff function. Its role, in this relationship, will be to establish the necessary procedures and forms, to provide statistical and other supporting information to the operations staff, and to co-ordinate the inputs of the operating divisions and the administrative elements into an overall

Centre budget. It is also the Comptroller's responsibility to ensure that the necessary revenues are available when required, to implement the proposed programmes.

Though the budget covers in detail a period of one year only, it should be so constructed as to cover in general terms a time frame of from three to five years. This makes it possible to express not only the immediate objectives, but also long term prospectives. It should be readily apparent to all that even ICARDA's short-term objectives will of necessity be achieved only when efforts are concentrated over a suitable time frame. Too often the budget concentrates its attention solely on the upcoming year.

At this time we would propose an alternative budgeting procedure in lieu of the once-a-year budget formulation activity followed by most Centres. In summary form, this procedure would require an annual operating budget to be calculated on a quarterly basis. Then at the completion of each quarter, Centre personnel would prepare a budget for the same period for the next operating year.

One can see a number of benefits to such an approach the principal one being that at the end of any one quarter Centre personnel are able to review past activity, on a current basis, prepare a budgetary allocation for the same period for the upcoming year and thereby maintaining a full twelve month continuous budget. Another prime benefit would be that ICARDA personnel would not be faced with major intensive budgeting activities for purposes of report submissions to the Consultative Group. Rather, throughout the past year, such personnel would have already prepared budget information for three quarters of the upcoming year so that only the remaining quarter would be the subject of their attention. This procedure is presented as a schedule at the end of this Section.

### Structure

The end result of the preceding activity will be the compilation of a detailed document, which after review and approval by the Board of Trustees, will be submitted to the Consultative Group for funding purposes. This information should also be used throughout the fiscal period in support of ICARDA's programme management. The elements of this document should include tables

showing the total Centre budget, total budgets for each programme and by location, and total budgets for each principal research station. The format of these tables should follow that established for the management report to facilitate the comparison of actual expenditures to budget throughout the fiscal year. The tables should be supported by narrative descriptions of programmes. They should also be accompanied by a revenue projection for the year and a review of activity to-date and into the future, expressed in technical as well as financial terms.

#### Operation of the Budget

There are two methods of administering a budget during a fiscal period. It may be held fixed, reflecting the original allocations throughout the period, or may be adjusted using the "funding" approach by transferring funds as required among programmes. The latter method requires that funds can only be spent when a positive balance is available in a particular budget line item. If insufficient funds are available, a transfer of budget allocations is made from one budget line item to another. This method transforms the budget into a record of actual performance and renders it ineffective as a management tool.

This paper proposes that the first method be adopted as it ensures that the budget performs its function in helping to evaluate progress towards planned objectives and permits the use of variance analysis. Variances should be considered as a signal, indicating that the programme is not evolving according to intentions. Judicious interpretations of these variances by the Comptroller's Office would indicate the nature of required corrective actions.

It is our opinion that all budgets should be realistic and conservative and that they should have a contingency reserve which can be used at the Director General's discretion. This allows the flexibility required in order that a budget not restrict the operations of the research effort.

Under this proposed system, the Programme Director is seen as having the authority to approve, within his discretion, overexpenditures in a particular budget line item, as long as the total programme budget is maintained. If deemed necessary, the Director General would approve all overexpenditures over and above the total programme budget.

1976 OPERATING YEAR

Quarter Completed	Second Quarter	Third Quarter	Fourth Quarter
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1977 OPERATING YEAR

First Quarter Budget	Second Quarter	Third Quarter	Fourth Quarter
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## FINANCIAL POLICIES



## FINANCIAL POLICIES

This section addresses a number of financial considerations which require review and development by ICARDA's management. These considerations involve investment policies, banking arrangements, the recovery of overhead on Special Projects and a number of other related financial issues.

### Finance Committee

It is recommended that the Board of Trustees appoint a Finance Committee comprised of four to six of its members based on their previous financial and administrative experience. In addition, the Director General and the Comptroller should be members of this Committee. The Committee should elect a Chairman who would report back to the Board of Trustees at each of the Board's meetings.

The responsibilities of the Committee would be to enquire into and advise on all aspects of the financial policies of the Centre and undertake such further responsibilities as would be assigned to it by the Board of Trustees from time to time.

For example the Committee would review investment policies, banking arrangements and the financial management reports. In addition the budget submission to the Consultative Group should be reviewed by the Committee prior to approval by the Board of Trustees.

The proper discharge of these responsibilities will involve a close relationship with the Director General and Comptroller. However, the Committee should possess no executive authority over management. Its responsibility should be to the Board of Trustees. The latter body would be expected to act upon such of the Finance Committee's observations and recommendations that it considers merit acceptance.

#### Investment Policies

It is anticipated that operating funds will be allocated to ICARDA in annual or periodic instalments. In these circumstances cash in excess of immediate requirements will be at the disposal of the Centre. The resources of the Centre would be augmented if such excess funds were invested in interest bearing short-term instruments such as government securities or promissory notes of banking

institutions or public utilities. Precautions would have to be devised to ensure that such investments were restricted to instruments offering adequate security. A list of such securities should be established by the Board of Trustees.

Responsibility for this programme might be delegated to the Director General, under the general supervision of a Finance Committee appointed from members of the Board of Trustees. Alternatively the function might be assigned to a responsible investment firm located in a prominent financial centre. Such an arrangement would also involve the supervision and consultation of a Finance Committee composed of members of the Board of Trustees.

#### Banking Arrangements

The establishment of elements of ICARDA's research programmes in three different Middle Eastern countries will necessitate that bank accounts be opened in each country, preferably in close proximity to the research station. Procedures should be established whereby bank statements, cleared cheques, and other pertinent documentation will be forwarded to ICARDA headquarters regularly, for further processing. Responsibility for administration

of overall banking arrangements should vest in the Comptroller while the branch accounts should be the responsibility of the respective field accountants.

If it is the opinion of the Board that wage and salary payments should be disbursed by cheque, this procedure would be facilitated by establishing separate payroll bank accounts, in addition to the regular operating accounts, at all three stations.

#### Signing Authorities

Sound financial control requires that all cheques drawn on the official bank accounts bear at least two signatures. Since the Comptroller is responsible for the custody of the Centre's assets, he should also be designated as one of the signing authorities. To avoid the dealy which would be occasioned by the absence of one of the signing authorities, it would be appropriate to designate three or more senior officials at each station and Headquarters as signing authorities for their respective accounts, with the stipulation that the signatures of any two are required to authenticate a cheque.

### Insurance

Care must be exercised in determining the legal requirements of the various host governments in respect of insurance. In addition to any mandatory coverage, adequate protection should be maintained for the Centre's buildings. With respect to automobile coverage while public liability should be carried, some thought should be given as to whether collision coverage is necessary. As an alternative to expensive collision premiums ICARDA would have to be prepared to assume the risk and cost of repair or replacement in event of collision damage.

### Payroll

Given the complexities of a three country operation and in the interests of strengthening internal control in such an environment the processing of salaries for locally employed personnel should be handled at Headquarters by utilizing a McBee one-write system. The major benefit of this system is the ability to prepare cheques, payslips, earnings records and payroll summaries simultaneously.

With respect to expatriate staff it is recommended that ICARDA commence to develop and formulate its own personnel policies. These would include such areas as pension plans, health or medical insurance, relocation benefits, allowances, etc. Given the probable absence of an immediate administrative ability to undertake such a responsibility ICARDA could examine the possibility of utilizing the services of an independent organization on a short-term contract basis as has been the approach of some of the existing international agricultural research centres.

#### Purchasing and Inventory Control

The purchasing function can be organized on a number of bases. It is expected that a centralized procurement organization would best serve ICARDA's requirements in the period immediately following its establishment. Generally, centralization offers sound control over decision making and commitment authority. Additionally it provides the advantages of standardization of major equipment items and the savings normally associated with quantity purchases.

As an alternative, decentralization offers the advantages of flexibility and quick response in decision making. In the context of ICARDA's requirements it would also make it easier for the Deputy Director General to ensure that equipment specifications are suitable to his particular requirements. It could significantly shorten lead times and simplify problems of transportation and customs clearance. To the extent that station requirements can be met by regional resources, a measure of goodwill with indigenous business operations may be developed.

It is our opinion, therefore, that once the basic infrastructure of ICARDA is in place, the Board may wish to examine the possibilities of a decentralized purchasing organization, with a view to at least modifying the system originally established.

Due to time delays in receiving invoices and difficulties in administering this area the Centre should consider charging shipping costs, freight, duty and such items to a clearing account and allocated to material on a percentage basis.

Perpetual inventory records should be maintained for all material and supplies received by the Centre. Their accuracy and adequacy should be checked by a periodic physical count of all stocks on hand both at Headquarters as well as the individual principal research stations.

#### Overhead Recovery on Special Projects

In order that Special Projects bear their fair share of overhead or administrative costs incurred in their development and management, a system should be devised whereby overhead can be calculated and applied on an equitable basis. The Comptrollers of the International Centres have addressed this problem and have developed a procedure toward this end. After reviewing, the Comptrollers proposal, and noting minor modifications, we are of the opinion that the method illustrated in the accompanying example provides an acceptable basis of allocation for overhead.

A further refinement of this method would be to segregate the costs of handling and purchasing material from the administrative overhead. This "material burden" charge could be applied to all



purchases of material and equipment thereby eliminating such costs from the general overhead of the Centre.

This charge is arrived at by totalling the budgeted costs of the Purchasing, Receiving and Stores functions and dividing by budgeted capital and material purchases.

The advantage of such method is to allocate material handling costs to those research programmes utilizing the services of the Purchasing, Receiving and Stores functions. Therefore those programmes with a high material or equipment content would absorb a corresponding portion of material handling charges. Furthermore this approach would tend to reduce the general administrative overhead rate on Special Projects to reasonable levels.

OVERHEAD RECOVERY PROPOSAL

	<u>TOTAL</u>	<u>ON-SITE</u>	<u>OFF-SITE</u>
Total Direct Costs of Research Programs and Special Projects			
Direct Research	3,385	3,385	-
Training and Conferences	751	751	-
Assistant Director General Research	174	174	-
Special Projects	1,300	800	500
	<u>5,610</u>	<u>5,110</u>	<u>500</u>
Total Costs allocated directly			
Information	313	313	-
Laboratory Services	50	50	-
Biometrics	161	161	-
Station Operation	208	208	-
Assistant Director Outreach	92	92	-
Physical Plant: Maintenance Building and Grounds, Security, Cleaning			
Utilities	457	457	-
	125	125	-
	<u>1,406</u>	<u>1,406</u>	<u>-</u>
Total Direct Costs	<u>7,016</u>	<u>6,516</u>	<u>500</u>



### Mechanization

The management and reporting system described herein is designed primarily to be compatible with a computer operation although it also lends itself to an initial manual recording operation. Practically speaking ICARDA will probably commence under a manual operation for the first year, during which time adequate study could be devoted to the problems associated with mechanization.

ICARDA must develop a management reporting system sufficiently sophisticated to allow its use as a management tool responsive to the information requirements of its professional personnel. We are of the opinion that this can only develop through the use of a mechanized (computer) system.

For further details on the implementation of a computer installation within the environment of an International Agricultural Research Centre, we would refer the reader to the report of P.S. Ross and Partners, which is included as an appendix to this report.

### Internal Control

As ICARDA establishes its principal research stations and delegates operating responsibilities to these locations it will become axiomatic that ICARDA's Senior Headquarter's management will become removed from the scene of actual day-to-day operations. This suggests that good internal control will be a key factor in the effective management of ICARDA.

ICARDA management will thus have to rely on various control techniques to implement its decisions and objectives. These objectives ordinarily include at least the following characteristics:

- a-) A plan of organization incorporating adequate segregation of functional responsibilities.
- b-) A system of authorization and recording procedures over transactions involving assets, liabilities, revenues and expenses.
- c-) Personnel of a quality commensurate with responsibilities.

Responsibility for establishing such techniques traditionally falls to the Comptroller of an organization. Consequently it is proposed that ICARDA's Comptroller be delegated the responsibility of developing internal control procedures consistent with the particular requirements of ICARDA's operations. It is envisioned that this assignment would be undertaken only at such time as ICARDA's development requires the implementation of complete accounting systems at each of the principal research stations.

CODE OF ACCOUNTS

## CODE OF ACCOUNTS

One of the vehicles whereby financial information is recorded and reported consists of a Code of Accounts. With respect to ICARDA, such a Code should be installed at all stations and at Headquarters so that the report formats will be identical. This will simplify the consolidation of the reported information. A code that is considered suitable to ICARDA's requirements is attached below. The suggested format is not overly sophisticated, but is capable of recording the necessary accounting information in a manner consistent with the Centre's requirements. It is designed to accommodate an accounting machine or computer programme application but as well could be effectively utilized in the context of an initial manual accounting system.



FORMAT FOR  
CODE OF ACCOUNTS  
OF ICARDA

In order to transfer information from the books of original entry to the general ledger and facilitate report preparation, it is necessary to have a uniform numbering structure. We are suggesting a structure which could initially serve a manual system but that is also easily adaptable for accounting machine or computer processing should ICARDA decide at some future time that more sophisticated accounting techniques are required. The general ledger account number under this system would consist of a maximum of 12 digits divided into four sub-sections which would identify the following information:

XX			
	XXX		
		XXXX	
			XXX

Account Type

Account Classification

Responsibility Centre

Subsidiary Account

ICARDA

FORMAT OF CODE OF ACCOUNTS

Account Type

- |                    |   |  |
|--------------------|---|--|
| <u>Purpose</u>     | - | To group accounts into various types for accounting purposes.  |
| <u>Description</u> | - | It is a two position numeric code. It constitutes the first level of grouping within the general ledger code according to the traditional breakdown of assets, liabilities, revenue and expense. Expenses have been grouped into categories shown below. |

ICARDA

FORMAT OF CODE OF ACCOUNTS

Account Type

Assigned Codes

- 01 Asset
- 02 Liability
- 03 Revenue
- 04 Expense - Special Projects
- 05 Expense - Lebanon Program
- 06 Expense - Syrian Program
- 07 Expense - Iranian Program
- 08 General Administration

XX			

ICARDA

FORMAT OF CODE OF ACCOUNTS

Accounting Classification

Purpose - To identify, for accounting reasons, within each account type the grouping of items according to a specific pattern.

Description - It is a three position numeric code. The code is used to group items within each account type, according to specific accounting requirements.

	XXX		

ICARDA

FORMAT OF CODE OF ACCOUNTS

Assigned Codes

Assets (01)

<u>Account Classification Code</u>	<u>Description</u>
- <u>Cash (100)</u>	
101	Petty Cash
102	Bank - General - (Name) - H.Q.
103	" " " - Lebanon
104	" " " - Syria
105	" " " - Iran
	To record receipt and disbursement of funds for the respective day-to-day operations.
106	Bank - Payroll - (Name) - H.Q.
107	" " " - Lebanon
108	" " " - Syria
109	" " " - Iran
	To record bank transfers from the general accounts to cover payroll requirements and to clear payroll cheques issued by the Centre.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
- <u>Accounts Receivable (200)</u>	
201	<u>Standing Travel Advance</u>  To record advances to be maintained at a fixed amount issued to field site personnel.
202	<u>Staff Travel Advance</u>  To record specific travel advances to employees, visiting scientists, or trainees.
203	<u>Other</u>  To record amounts due resulting from expenses of a personal nature incurred by employees while travelling on behalf of ICARDA.
204	<u>Deposit Accounts</u>  To record deposits made for the use of Goods/Services from various suppliers, e.g. Rent/Utility deposits.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
<u>- Accounts Receivable (200) (cont'd)</u>	
205	<u>Special Project Advances</u> To record travel advances to persons regarding a specific special project. Expenditures from these advances are special project costs.
206	<u>Standing Travel Advances (Special Projects)</u> To record advances to be maintained at fixed amounts - issued to special project personnel. This account should have a nil balance at the end of the fiscal year and is used during the year for control purposes only.
207	<u>Grants Receivable - Unrestricted Programs</u> To record amounts to be received from CGIAR on the basis of final CGIAR approved operating and capital budgets.



ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
<u>- Accounts Receivable (200) (cont'd)</u>	
208	<u>Grants Receivable - Restricted Programs</u>  To record amounts to be received from CGIAR on the basis of final CGIAR of final CGIAR approved operating and capital budgets.
209	<u>Grants Receivable - Special Projects</u>  To record amounts to be received from donor agencies on the basis of specific approved project proposals as defined in the CGIAR Accounting and Budgetary Guidelines.

MON, OCT 3, 1994

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Review of the existing and potential role of legumes in farming systems of the Near East and North African region : a report to the International Centre for Agricultural Research in the Dry Areas (ICARDA)  
Adelaide : Waite Agricultural Research Institute, University of Adelaide, 1978 120 p. : ill.

lang: ENGL date: 1978 isn: 32047 statc: RCMPL astat:  
COMPL  
location: CIRC 631.58 C 3

Makes an appraisal of the existing crop and livestock situation in the Middle East and North Africa, and the opportunities for increasing both cereal and livestock production concentrating on the potential for change. Includes references.

/CULTIVATION SYSTEMS/ /LEGUMINOSAE/ /MIDDLE EAST/ /NORTH AFRICA/ -  
/AUSTRALIA/ /GRASSLANDS/ /FORAGE CROPS/ /FEED/ /RESOURCES DEPLETION/  
/LIVESTOCK/ /PLANT PRODUCTION/ /AGRICULTURAL RESEARCH/ /AGRICULTURAL  
STATISTICS/

International Center for Agricultural Research in the Dry Areas, Aleppo

Better harvests in dry areas : ICARDA's Cereal Research Program  
Aleppo : ICARDA, 1983 23 p. : ill. lan: E date: 1983 isn: 32935  
subcod: AGR statc: RCMPL astat: COMPL  
location: CIRC 633.1.001.5 I 5

/CEREALS/ /AGRICULTURAL RESEARCH/ /RESEARCH PROGRAMMES/ /RESEARCH  
CENTRES/ /ARID ZONE/ /SEMI-ARID ZONE/ /DEVELOPING COUNTRIES/

Audet, R.J. Zdyb, E.M. Perrin, C.L.  
IDRC, Ottawa, ON

\* Concept of a management information system for the International Centre for Agricultural Research in Dry Areas (ICARDA)  
Ottawa, Ont. : IDRC7, 1976 1 v. (various pagings)

lang: ENGL date: 1976 isn: 33949 statc: RCMPL astat:  
COMPL  
location:

ARCHIV AUDET no. 01  
MFICHE IDRC-lib-33949

Discusses recommendations for ICARDA's practices of financial management, the organizational requirements, the information needs and resultant reports, budgetary considerations and financial policies.

/IDRC PERSONNEL/ /FINANCIAL MANAGEMENT/ /MANAGEMENT INFORMATION SYSTEMS/  
/AGRICULTURAL RESEARCH/ - /FINANCIAL POLICY/ /BUDGET/ /COMPUTERS/  
/MANAGEMENT DEVELOPMENT/ /RECOMMENDATIONS/ /COST ACCOUNTING/

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ICARDA

FORMAT OF CODE OF ACCOUNTS

Account Classification Code

Description

- Inventories (300)

301	Inventory - Field Supplies
302	Inventory - Research Supplies
303	Inventory - Canteen Operations
304	Inventory - Office Supplies
305	Inventory - Housekeeping

Above accounts utilized to record purchase of various materials and supplies to be inventoried at headquarters as well as principal research stations.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
- <u>Fixed Assets (400)</u>	
401	<u>Land</u> This account to include all costs incurred by the Centre with respect to the acquisition of title and development costs of research field sites. Included would be such costs as: fencing, water systems, site development, roads, parking areas, landscaping.
402	Staff Residences
403	Transportation Equipment
404	Trainee Housing
405	Visiting Scientist Housing
406	Guest Houses
407	Administration Building

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
- <u>Fixed Assets (400) (cont'd)</u>	
408	<u>Field Equipment</u> This account would include costs of capital equipment owned by the Centre and used at field sites. Included would be such item as: tillage, tractors, mechanized implements.
409	<u>Research Equipment</u> This account would include costs of scientific laboratory equipment owned by the Centre and used at Headquarters and/or field sites.
410	<u>Office Equipment and Furnishings</u>
411	<u>Construction-in-Progress</u> To record acquisition and construction costs before completion of construction. At time of completion final costs are transferred to specific fixed assets sub-accounts.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
- <u>Deferred Charges (500)</u>	
501	<u>Deferred Charge - Core (Restricted)</u> To record annual core (restricted) budget approved by Board of Trustees.  NOTE: This account will be adjusted (if necessary) should final budgets approved by CGIAR differ from ICARDA submissions.
502	<u>Deferred Charge - Core (Unrestricted)</u> To record annual core (unrestricted) budget approved by Board of Trustees.  NOTE: This account will be adjusted (if necessary) should final budgets approved by CGIAR differ from ICARDA submissions.
503	<u>Deferred Charge - Special Projects</u> To record the amount of funds required to offset the outstanding commitments of special projects.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
- <u>Other Assets (600)</u>	
601	<u>Short-term Investments</u> To record investments made with funds in excess of current operating needs.
602	<u>Prepaid Expenses</u> To record that portion of costs the benefits of which extend beyond the current fiscal year end.

FORMAT OF CODE OF ACCOUNTS

Liabilities (02)

Account Classification Code

Description

201

Accounts Payable

To record amounts owed suppliers resulting from contract holdbacks, operating costs incurred or estimated incurred, but not yet paid.

202

Accrued Rent

To record amounts due for rental costs incurred or estimated incurred, but not yet paid.

203

Accrued Travel

To record amounts due to suppliers for travel costs incurred or estimated incurred, but not yet paid.

204

Payroll Clearing

To record net payroll amounts and amounts due to staff for salaries earned or estimated earned, but not yet paid.



ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
205	<u>Payroll Clearing - Syria</u> To record net payroll amounts and amounts due to staff for salaries earned or estimated earned, but not yet paid.
206	<u>Payroll Clearing - Iran</u> To record net payroll amounts and amounts due to staff for salaries earned or estimated earned, but not yet paid.
207	<u>Taxes Payable</u> To record the liability for amounts withheld and to be remitted on behalf of employees.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Account Classification Code

Description

208

Supplementary Benefits

To record the liability for amounts withheld and to be remitted on behalf of the Centre and its employees.

NOTE: Separate Account Classification Codes and Descriptions may be created for each type of benefit implemented by Centre Management. These could include:

Retirement Funds  
Group Life Insurance  
Accidental Death and  
Dismemberment Plans  
(incl. war risk)  
Medical Insurance Plans  
Disability Income Insurance  
Statutory Benefits.

209

Other Payables

To record amounts owing but not covered by any of the preceding liability accounts.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
210	<u>Surplus</u> To record the cumulative excess of programme revenues over expenditures.
211	<u>Capital Grants - Fully Expended</u> To recognize capital funding amounts at the time of capital disbursements.
212	<u>Advances - Special Projects</u> To record funds received for special projects.
213	<u>Program Commitments - Core Unrestricted</u> To record annual core unrestricted budget approved by CGIAR.
214	<u>Program Commitments - Core Restricted</u> To record annual core restricted budget approved by CGIAR.

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ICARDA

FORMAT OF CODE OF ACCOUNTS

Account Classification Code

Description

215

Program Commitments - Special Projects

To record the financial obligation to third parties resulting from signed contracts to undertake specific special projects on behalf of other agencies/institutions.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Revenues (03)

<u>Account Classification Code</u>	<u>Description</u>
301	<u>Core Operating - Restricted</u> To record the annual operating grant (s) received from the CGIAR.
302	<u>Core Operating - Unrestricted</u> To record the annual operating grant (s) received from the CGIAR.
303	<u>Other Grants</u> To record operating grant (s) received from other donor agencies.
304	<u>Capital Grants</u> To record capital grant contribution (s) received from the CGIAR.
305	<u>Other Capital Grants</u> To record capital grant contribution (s) received from other donor agencies.

ICARDA

FORMAT OF CODE OF ACCOUNTS

<u>Account Classification Code</u>	<u>Description</u>
306	<u>Interest Income</u> To record interest earned on funds invested by the Centre.
307	<u>Rental Income</u> To record rental income from residences owned by the Centre.
308	<u>Training Courses</u> To record income from fees charged by the Centre for short-term in-house training programmes undertaken by the Centre.
309	<u>Other Income</u> To record income from sources other than noted previously.
310	<u>Special Projects</u> To record income from grants from donor agencies other than the CGIAR for special projects as defined by the CGIAR.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06 07 and 08

04	XXX		
05			
06			
07			
08			

Program Disbursements

		<u>Special Projects</u>	<u>Lebanon</u>	<u>Syria</u>	<u>Iran</u>	<u>General Administration</u>
		04	05	06	07	08
001	Salaries - regular	x	x	x	x	x
002	- overtime	x	x	x	x	x
003	Allowances - overseas	x	x	x	x	x
004	- rental	x	x	x	x	x
005	- utilities	x	x	x	x	x
006	- other	x	x	x	x	x
007	Employee benefits	x	x	x	x	x
008	Casual help	x	x	x	x	x

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06 07 and 08

		<u>Program Disbursements</u>				
		<u>Special Projects</u>	<u>Lebanon</u>	<u>Syria</u>	<u>Iran</u>	<u>General Administration</u>
		04	05	06	07	08
009	Professional and special services	x	x	x	x	x
010	Honoraria	-	-	-	-	x
011	Trustees' meetings and travel	-	-	-	-	x
012	Translation	x	x	x	x	x
013	Rent and utilities	x	x	x	x	x
014	Renovations	x	x	x	x	x
015	Office supplies and expenses	x	x	x	x	x
016	Secretarial	x	x	x	x	x
	Office furniture and equipment					
017	- stock	-	-	-	-	x
018	- accountable	x	x	x	x	x
019	- non-accountable	x	x	x	x	x
020	Equipment - vehicles	x	x	x	x	x
021	- research	x	x	x	x	x
022	- other	x	x	x	x	x



ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06 07 and 08

		<u>Program Disbursements</u>				
		<u>Special Projects</u>	<u>Lebanon</u>	<u>Syria</u>	<u>Iran</u>	<u>General Administration</u>
		04	05	06	07	08
023	Equipment rental	x	x	x	x	x
024	Vehicles operation and maintenance	x	x	x	x	x
025	Travel	x	x	x	x	x
026	Communications	x	x	x	x	x
027	Local mileage and parking	x	x	x	x	x
028	Hospitality	x	x	x	x	x
029	Staff catering costs	-	x	x	x	x
030	Seminars, meetings and conferences	x	x	x	x	x
031	Relocation expenses	x	x	x	x	x
032	Membership fees	x	x	x	x	x
033	Printing and reproduction	x	x	x	x	x
034	Publications	x	x	x	x	x
035	Insurance	x	x	x	x	x
036	Training	x	x	x	x	x
037	Freight and express	x	x	x	x	x
038	Bank charge	x	x	x	x	x
039	Postal services and postage	x	x	x	x	x
040	Binding	-	-	-	-	x

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06 07 and 08

		<u>Program Disbursements</u>				
		<u>Special Projects</u>	<u>Lebanon</u>	<u>Syria</u>	<u>Iran</u>	<u>General Administration</u>
		04	05	06	07	08
041	Microform	-	-	-	-	x
042	Periodicals	-	x	x	x	x
043	Books	-	x	x	x	x
044	Consultants fees	x	x	x	x	x
045	Research staff costs	x	-	-	-	-
046	Research expenses	x	-	-	-	-
047	Computer services	-	-	-	-	x
048	Foreign exchange differences	-	-	-	-	x
049	Grants	x	x	x	x	x
050	Maintenance staff residences	-	x	x	x	x
051	Depreciation expenses	-	x	x	x	x
052	Building - operation	-	x	x	x	x
053	Repairs - vehicles	x	x	x	x	x
054	Taxes	x	x	x	x	x
055	General supplies	x	x	x	x	x

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

001 Salaries - Regular

To record remuneration to personnel for their services during regular hours.

002 Salaries - Overtime

To record remuneration to personnel for their services during other than regular hours.

003 Allowances - Overseas

To record a cost of living allowance paid to personnel assigned to work outside Headquarters or work station locations.

004 Allowances - Rental

To record housing allowance paid to personnel assigned to work outside Headquarters or work station locations.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

005 Allowances - Utility

To record a utilities allowance paid to personnel assigned to work outside Headquarters or work station locations, including, but not limited to: (a) gas charges, water charges, fuel for heating, fuel for cooking, and electricity charges; (b) cost of all initial installation fees for appliances including telephone and the cost of repairs to meters.

006 Allowances - Others

To record sundry allowances paid to employees assigned to work outside Headquarters or work station locations, including, but not limited to: tuition fees, transportation allowances, education allowances, and language lessons.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

007 Employee Benefits

To record the Centre's contribution (on behalf of employees) to various cost-shared benefit plans including, but not limited to: health, pension, and insurance plans.

008 Casual Help

To record the cost of services provided by an individual where the person (s) works under the direction and control of the Centre, including, but not limited to: clerical and secretarial services, and daily-rated labour.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

009 Professional and Special Services

To record the cost of services provided by a professional individual or company where the person (s) does not work under the direction and control of the Centre, including, but not limited to: legal, agency, and consultancy fees. Types of costs included in this category are direct compensation, allowances, travel costs, insurance coverage, etc.

010 Honoraria

To record remuneration to Trustees for their attendance at Board of Trustees meetings and various Committee meetings.

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

011 Trustees' Meetings and Travel

To record all costs (other than honoraria) associated with attendance at Board of Trustees and Committee meetings, including, but not limited to: transportation and accommodation expenses.

012 Translation

To record the cost of translation services provided by an individual or company where the person (s) does not work under the direction and control of the Centre.

013 Rent and Utilities

To record the cost of rental and utility payments for premises and furniture/furnishings leased by the Centre, including, but not limited to: rent, water charges, gas charges, heat, light, and power.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

014 Renovations

To record the cost of modifications to premises leased by the Centre, including, but not limited to: partitioning, shelving, lighting, doors, and wall and ceiling installation or removal.

015 Office Supplies and Expenses

To record the cost of supplies and services required for the day-to-day operation of the Centre, including, but not limited to: stationery, cassettes, maintenance agreements for equipment, typewriter ribbons, calculating machine tapes, repairs to equipment, advertising, pens, pencils, name plates, extension cords, rubber stamps, binders, file folders, telephone directories, kitchen supplies, note pads, refreshments for parties, book covers, matches, keys,



ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

015 Office Supplies and Expenses (cont'd)

picture frames, medical supplies, envelopes and office forms. This account will also include minor furnishings such as blinds, curtains, drapes, and other types of expendable equipment of nominal value.

016 Secretarial

To record the cost of secretarial services provided by individuals to indentifiable projects.

017 Office Furniture and Equipment - Stock

To record the cost of accountable inventory items purchased for stock. Upon issuance of an item from stock its full cost is to be charged to the recipient program.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

018 Office Furniture and Equipment - Accountable

To record the cost of inventory items with a per unit purchase price in excess of \$25.00. Exceptions to this dollar value limitation include chairs and desk lamps which should be accounted for regardless of their individual dollar values.

019 Office Furniture and Equipment - Non-accountable

To record the cost of inventory items with a per unit purchase price not exceeding \$25.00. Identifiable transportation and installation costs are included in this account. Loss/Gain on sale of Office Furniture - Accountable to be recorded in this account.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

020 Equipment - Vehicles

To record the purchase price of all vehicles purchased by the Centre. Items chargeable to this account include base purchase cost, identifiable transportation and other order-filling costs.

021 Equipment - Research

To record the purchase price of all research equipment purchased by the Centre. Items chargeable to this account include: base purchase cost, identifiable transportation, and other order-filling costs.

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ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

022 Equipment - Other

To record the purchase price of equipment other than Vehicles and Research. Items chargeable to this account include: base purchase cost, identifiable transportation, and other order-filling costs.

023 Equipment Rental

To record the cost for use of equipment not owned by the Centre.

024 Vehicle Operation and Maintenance

To record the operating costs of all vehicles in use by the Centre including, but not limited to: gas, oil, insurance, car wash, tires, servicing, overhauls, licences and fees, rental payments, garage storage, etc.

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ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

025 Travel

To record the costs of travel undertaken by personnel either on behalf of the Centre or approved special projects, including, but not limited to: air, train, and bus fares; taxis, cost for use of personal car, accommodation, meals, tips, laundry, currency exchange, AMEX membership fees, and registration fees for Centre personnel attending seminars, meetings, and conferences sponsored by other institutions. Subsidiary codes would be used to differentiate between business trips, annual leave, compassionate leave, medical evacuation, etc.

026 Communications

To record the cost of all forms of communication used by the Centre, including, but not limited to: telex, telephone, telegraph, messenger services, etc.

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

027 Local Mileage and Parking

To record the cost of travel within a local area, including, but not limited to: bus and taxi fares, parking charges, and cost for use of personal car.

028 Hospitality

To record the cost when a staff member extends hospitality where it is considered necessary or desirable to facilitate the conduct of Centre business or as a matter of courtesy toward visitors to the Centre.

029 Staff Catering Costs

To record costs incurred and the receipt of funds resulting from the operation of an in-house catering service for staff members.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

030 Seminars, Meetings and Conferences

To record the cost of seminars, meetings and conferences sponsored by the Centre, including, but not limited to: accommodation, transportation, membership fees, catering services, and working lunches. Sub-codes could be designated to allow accumulation of expenditures by courses and individual trainees for such expenses as per diem, local travel, books, supplies and materials, tuition and fees, relocation, etc.

031 Relocation Expenses

To record the cost incurred to relocate personnel to areas designated by the Centre, including, but not limited to: shipping charges for household goods and personal effects, insurance, legal fees, transportation, accommodation, non-accountable allowances, and lease arrangements.

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

032 Membership Fees

To record the cost of registration for membership in societies, institutes, etc. related to the employees profession.

033 Printing and Reproduction

To record the cost of in-house reproduction and outside printing services, including, but not limited to: reproduction meter charges and equipment rental, supplies and paper, film, reproduction from photograph negatives, printing of business cards, and personal note sheets; reproduction of memos, mailing lists, worksheets and reports.



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ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

034 Publications

To record the cost of printing, photography and binding of Centre publications, including, but not limited to: booklets, reports, and newsletters.

035 Insurance

To record all premium payments on insurance coverage contracted by the Centre, including adjustments for additional or return premiums, made to insure against loss by fire/theft to buildings and content and to office and/or residential furniture, furnishings and equipment, vehicles, third party liability, and to insure against loss under miscellaneous coverages respecting fidelity, forgery, general liability, hold-up and robbery.

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ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

036 Training

To record the cost of tuition and associated expenses pertaining to special courses and training programs for Centre personnel.

037 Freight and Express

To record charges by carriers for the transport of goods. Included in this account are charges which cannot be specifically related to the item of purchase.

038 Bank Charges

To record amounts charged by banks for the cost of currency and the operation of Centre bank accounts, including, but not limited to: services charges and cable charges.

- 97 -

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

039 Postal Services and Postage

To record the cost of postal services for the Centre, including, but not limited to: postage stamps, postage meter refills, and mail delivery charges.

040 Binding

To record the cost of binding for all Centre Library material.

041 Microform

To record the cost of all publications that have been micro-reduced, including, but not limited to: microfilm and microfiche.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

042 Periodicals

To record the cost of subscriptions for journals, annuals, and standing orders for monographic services.

043 Books

To record the cost of all monographs, newspapers, reference services, publications, and annual subscriptions.

044 Consultants Fees

To record the remuneration paid to consultants for their services.

- 99 -

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

045 Research Staff Costs

To record the remuneration paid to research staff for their services to special projects, including, but not limited to: salaries and allowances paid to research officers and assistants.

046 Research Expenses

To record research expenses incurred on behalf of special projects, including, but not limited to: materials and supplies.

047 Computer Services

To record the cost of rental of data processing equipment including charges for outside computer time.

- 100 -

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

048 Foreign Exchange Differences

To record any exchange variations resulting from currency conversion.

049 Grants

To record the payment of outright grants to third parties in support of training conferences and seminars, research support, etc.

050 Maintenance Staff Residences

To record costs associated with the maintenance and upkeep of Staff Residences including, but not limited to: painting, cleaning renovations, insurance, utilities, property taxes, and miscellaneous replacement items.

- 101 -

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

051 Depreciation Expense

To record yearly depreciation of real property owned by the Centre. Each asset is written off on a straight line basis.

052 Building - Operation

To record operating expenses incurred in premises owned/leased by the Centre. Types of expenditures would include contract cleaning, window cleaning, supplies and equipment, repairs and maintenance (building structure, and furniture, furnishings), watchmen protection.

- 102 -

ICARDA

FORMAT OF CODE OF ACCOUNTS

Expenses - 04, 05, 06, 07 and 08

Detailed Descriptions

053 Repairs - Vehicles

To record expenses incurred for the repair (including parts) of vehicles owned/leased by the Centre.

054 Taxes

To record the following Centre expenditures (where applicable): real estate tax - state or municipal (other than staff residences), income tax on behalf of Centre employees.

055 General Supplies

To record the cost of small tools, porter's supplies, uniforms, towels, laundry service, gloves, gardener's supplies, and similar items associated with field operations.



FORMAT OF CODE OF ACCOUNTS

Responsibility Centre

- Purpose - To identify areas within the organization to which program disbursements are allocated.
- Description - It is four position, numeric code. The code identifies an area in the organization to which general and administration expenses are allocated. The first position identifies an administrative area within the organization. The last positions identify a particular function within that administrative area.

The assigned codes are in groups as shown on the following page.

		XXXX	

ICARDA

FORMAT OF CODE OF ACCOUNTS

Responsibility Centre

1000	Crop Improvement
1001	Crop Development
1002	Crop Protection
2000	Farming Systems
2001	Soil-Plant-Water
2002	Animal Protection
2003	Ag Economic and Rural Sociology
3000	Training and Workshops
4000	Research Support Units
4001	Library
4002	Information Services
4003	Common Lab Services
4004	Statistics and Computational Lab
5000	General Administration
5001	Board of Trustees
5002	Director General's Office
5003	Accounting
5004	Purchasing
5005	Personnel
6000	Special Projects

NOTE: Structure of preceding codes could be further refined to reflect a number of cost centres within each of the individual responsibility centres.

ICARDA

FORMAT OF CODE OF ACCOUNTS

Subsidiary Account Code

- Purpose - To provide a unique code for detailed Centre operation information.
- Structure - A three digit numeric code. The assigned codes are in groups as shown below.

			XXX

100	Lebanon
200	Syria
300	Iran
400	Staff Designations
500	Training Courses
600	Building Designations
700	Donor Organizations
800	Special Projects
900 - 949	Unrestricted Program Expenditures
950 - 999	Restricted Program Expenditures

## SUMMARY OF RECOMMENDATIONS

## SUMMARY OF RECOMMENDATIONS

The points listed below summarize IDRC's recommendations contained in the body of this paper. These recommendations are offered in the belief that they will contribute towards assisting ICARDA to implement a management information system well suited towards its immediate and long-term management requirements. The recommendations are presented in the order of the main sections of this paper.

### Management Philosophy

The total activity of ICARDA should be construed as a "team effort" towards definable research objectives. In this context the management information system is to be used by the scientific research professionals in cooperation with their counterpart administrative team members.

### Structure of the Comptroller's Office

- Professional qualified accountants should be employed to undertake the responsibilities of Comptroller, Financial Grant Administrators, and Field Accountants.

- The Comptroller should be hired immediately in order to ensure an orderly development of the administrative and financial functions of ICARDA.
- A sufficient degree of authority and responsibility must be delegated to the Comptroller.
- The Comptroller's Office should be so organized, so as to promote close cooperation between scientific and administrative personnel.
- Consideration should be given to the eventual decentralization of the accounting function to the principal research station level.

#### Internal and External Reporting Requirements

- ICARDA's accounting records should be maintained on a programme rather than a discipline basis.
- Expenditures should be charged directly to research programmes whenever they can be defined or identified.
- Administrative costs should be identified as an independent responsibility Centre.
- Obligations should be recognized at the time they are formally incurred and reported in all monthly Management Reports.
- Monthly reports to ICARDA's Management should consist of a minimum of:
  - Balance Sheet;
  - Statement of Income and Expenditure;
  - Management Report reflecting approved budget and expenditures by programme, location, and object of expenditure.

### Budgetary System

- Budget should be expressed in terms of programme objectives on a realistic and conservative basis.
- Translation of ICARDA's programme objectives into budgetary terms should be the responsibility of programme managers with the assistance of the Comptroller's Office.
- A detailed budget is required for the upcoming operating year and in addition an overall three to five year programme forecast should also be prepared.
- ICARDA should adopt budget formulating procedures on a quarterly basis with corresponding forecasts prepared for the following operating year.
- Original budget provisions should be held fixed throughout the year with approval of overexpenditure being the responsibility of both programme managers and the Director General.

### Financial Policies

#### Finance Committee

- Board of Trustees to appoint a Finance Committee of four to six Trustees in addition to the Director General and Comptroller.
- Chairman of Finance Committee to report at each Board of Trustees meetings.
- The Committee should report directly to the Board of Trustees and has no executive authority over management.

### Investment Policies

- ICARDA's Board of Trustees should outline a list of approved investment instruments for the purpose of safeguarding short-term investment of cash funds in excess of operational requirements.
- Investment authority should be delegated either to the Director General of ICARDA or a responsible investment firm.

### Banking Arrangements

- Bank arrangements (both operations and payroll) should be undertaken for both Headquarters and each principal research station in the host countries.
- Responsibility for overall administration should rest with the Comptroller's Office.

### Signing Authorities

- All ICARDA cheques must bear at least two signatures, one of which should be the Comptroller.
- Three or four senior officials at Headquarters and each principal research station should be designated with alternative cheque signing authority.

### Insurance

- Mandatory liability coverage and sufficient asset coverage against loss and damage should be arranged shortly after the creation of ICARDA.



- Collision coverage on ICARDA vehicles should be arranged only when the cost of premiums is attractive in relation to the risk and cost of collision damage in local conditions.

#### Payroll

- ICARDA should implement a McBee one-write payroll system for local staff.
- ICARDA should develop its own personnel policies or obtain the services of an outside organization on a short-term contract basis.

#### Purchasing and Inventory Control

- This function should initially be centralized at ICARDA's Headquarters but some thought given to delegation to the principal research stations when logistics indicate sufficient financial and operational benefits.
- Shipping costs, freight, duty etc... should be allocated on a percentage basis to each purchase of equipment or operating material.
- ICARDA should implement a system of perpetual inventory records at Headquarters and each principal research system combined with periodic physical inventory counts.

#### Overhead Recovery on Special Projects

- ICARDA should establish an overhead recovery rate in order to ensure its Special Projects bear their fair share of administrative and management costs.

- ICARDA should adopt the overhead recovery procedure developed by the Comptrollers of the International Centres (and as modified by IDRC with respect to a separate "material burden" calculation).

#### Mechanization

- ICARDA should undertake immediate steps in order to identify the optimum computer configuration to satisfy its scientific and administrative requirements both in the immediate as well as long-term future. Specific reference is made to the comments of P.S. Ross and Partners on this issue.

#### Internal Control

- ICARDA should implement a system of internal control techniques consistent with its management requirements.
- Development of this internal control system should be delegated to ICARDA's Comptroller at the time complete accounting responsibility is established at the principal research station level.

## APPENDICES

AN EXAMINATION OF  
MANAGEMENT ACCOUNTING AND REPORTING PRACTICES  
AND  
COMPUTING CAPABILITIES  
AT THE  
INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

July, 1974

P. S. ROSE & PARTNERS

## P. S. ROSS & PARTNERS

MANAGEMENT CONSULTANTS 90 SPARKS STREET, OTTAWA K1P 5B4, CANADA, 236-9662

July 3, 1974

Dr. W. D. Hopper  
President  
International Development Research Centre  
60 Queen Street  
Ottawa, Ontario

Dear Dr. Hopper:

We are pleased to submit our report entitled "An Examination of Management Accounting and Reporting Practices and Computing Capabilities at the International Agricultural Research Centers". This report represents the results of our work over the last five months undertaken at your request on behalf of the Centers and is intended to serve as a basis for specific action by the Center Directors and others on these two topics of major general interest. In addition, specific comments are being provided to each Center Director on matters of local concern, where the level of detail of the discussion would not be of general interest.

In submitting our report, we wish to thank you, the Center Directors and the representatives of donor agencies for the warm reception and full cooperation accorded our study team during their visits. We trust that the resultant understanding of the Centers which we have gained is well reflected in our findings, conclusions and recommendations.

We have appreciated the opportunity of undertaking this important work on behalf of the Centers. If you should wish to discuss any aspect of this report or the work which it represents, we will be pleased to do so at your convenience.

Sincerely,

P.S. ROSS & PARTNERS



Robert V. Brouillard  
Partner

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## I. INTRODUCTION

Over the last fifteen years, several agricultural research centers have emerged in various geographic locations of the world. Though some of these centers have their origins in older development projects, their growing co-operation in the exchange of scientific and technical knowledge is resulting in an increasingly parallel development in organizational style and management processes. Contributing to these developments is the strong interest of the suppliers of Center research funds in common financial information. Since its formation in 1971, the Consultative Group on International Agricultural Research (CGIAR) has been striving to balance the increasing demands of the Centers with the availability of funds from the sponsors. As part of this activity, the Consultative Group and the Centers recognized the need for common financial reporting procedures across all Centers. A workshop on budgeting and accounting practices was held in February, 1972, followed in June, 1973 by the production of a common framework for budgeting and accounting procedures and practices by the Consultative Group Secretariat. The paper describing these procedures and practices was accepted by the Center Directors for use in preparing the 1974 budget proposals.

However, with the gap between supply and demand for funds continuing to narrow on every front, donors and sponsors increasingly are demanding improved financial forecasting of commitments and expenditures, the introduction of longer term financial planning, and the establishment of management processes which link the technical program with costs to permit an evaluation of effectiveness. As part of this process, the information requirements of the Consultative Group have been the subject of several reports, culminating in the acceptance by the Group in early 1974 of the Report of the Subcommittee on Center Review Procedures.

In parallel with these developments, Center Directors began, during Centers Week of 1973, to express uneasiness with regard to their expanding information processing needs and the manner in which these might best be satisfied. Faced with many common reporting requirements, the Centers would continue their evolution towards common management

practices as expeditiously as possible. But, several questions were arising concerning the extent to which individual practices could be harmonized, the degree of sophistication possible, the time frame within which this could be accomplished, the costs involved and the benefits to be achieved. Somewhat related to this subject was the general issue of computing power capability, not simply to facilitate financial management reporting but more significantly to support program management activities and to meet other research support needs. The differing nature of supply alternatives available to meet these needs and the varying stages of development of the Centers themselves made the question of common or parallel computing capability difficult to address.

In this context of these related concerns, International Development Research Centre engaged P.S. Ross & Partners on behalf of the Centers, to examine their management reporting and computing capability requirements. This report describes the scope of the work conducted and addresses the environment in which the Centers operate. The requirements for management reporting and the question of computing capability both are examined, and recommendations and approaches to satisfy these needs are presented. In addition, a separate report has been provided to each Director, with a view to addressing those topics of particular concern to the individual Center.



## II. OBJECTIVES

The objectives of this study are:

- \* To examine individual and collective requirements for management accounting and reporting at:
  - Centro Internacional de la Papa (CIP)
  - Centro Internacional de Agricultura Tropical (CIAT)
  - Centro Internacional de Mejoramiento de Maiz Y Trigo (CIMMYT)
  - International Institute of Tropical Agriculture (IITA)
  - International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
  - International Rice Research Institute (IRRI)
- \* To identify their individual and collective computing and information processing requirements.
- \* To examine the availability of computing resources to each of these Centers.
- \* To pinpoint opportunities for common action by the Centers, with respect to reporting requirements or computing needs.
- \* To recommend strategies which will enable the Centers to proceed with the development of these opportunities.

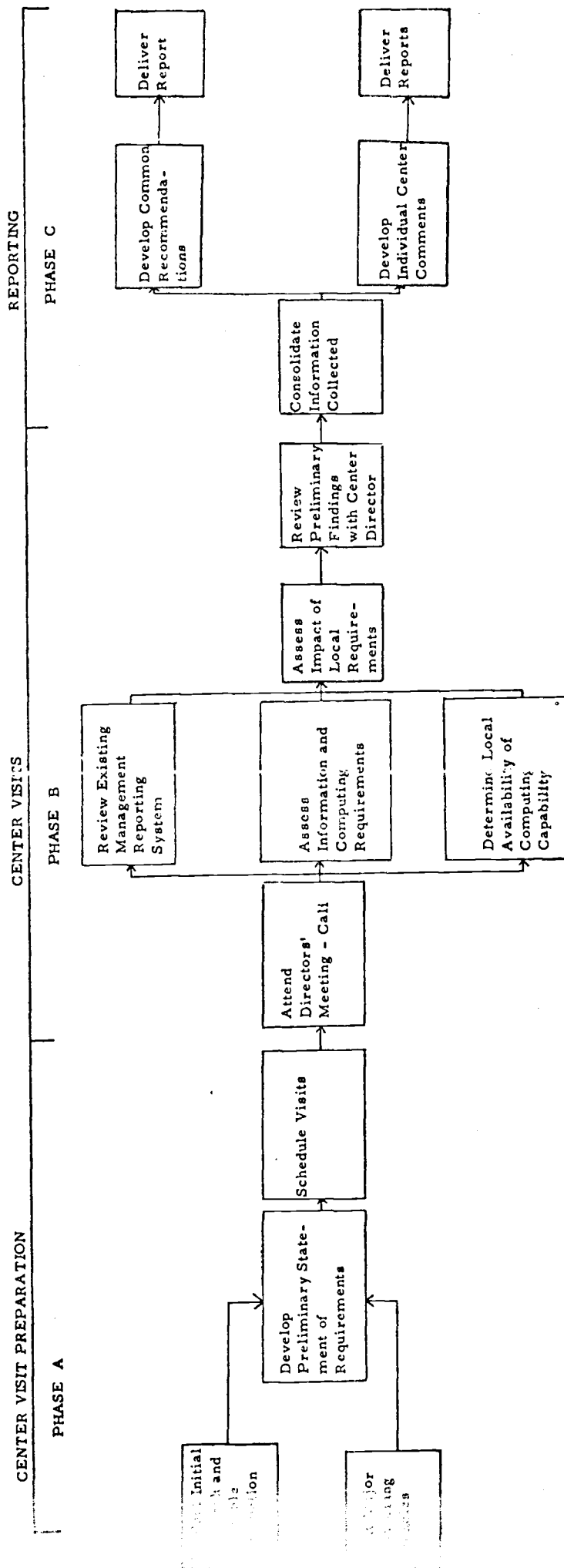
### III. SCOPE AND METHODOLOGY

The study was conducted as originally planned, in three distinct phases shown schematically in Exhibit 1. The first phase - Center Visit Preparation - began with initial research into the operations of the Centers. Background information which would be useful in formulating preliminary statements of information requirements for the Centers was collected and examined. Furthermore, since a certain commonality in information requirements was presumed to exist among the Centers, the intention was to clarify generally the extent to which this might be possible. A review of available literature, discussions with IDRC and other personnel in Canada, and visits with representatives of major funding agencies located in New York and Washington were the primary sources of information.

Our examination of the Common Accounting and Budgeting Procedures and Practices and the Center Review Procedures quickly established that a level of harmonization in reporting was possible. Discussions with several donor agencies confirmed this hypothesis and, more importantly, helped to provide an understanding of the framework within which the Centers operate. From these inputs, the study team began the development of a preliminary statement of requirements as a basis for discussion with the Centers. The scheduling of the visits to each of the six international agricultural research organizations completed the work of this phase.

The second phase - Center Visits - was concerned with examining the appropriateness of our preliminary statement of requirements by reviewing the existing management reporting systems and collecting and assessing the individual information and computing requirements of each Center. Each visit began by meeting the Director or his designate to review the overall work program as originally planned, thereby providing an opportunity for the Director to focus our efforts on areas of specific concern to that Center. Subsequent to this initial meeting which established the parameters of our review, we proceeded to interview those senior members of the staff who it had been suggested would provide the most useful information and perspectives. As part of each visit, we conducted an independent review of the local computing

SCHEMATIC OF STUDY METHODOLOGY



capabilities accessible to each Center. This involved a series of interviews with local computer manufacturers, distributors, service bureaux and professionals to determine the extent of capacity available or likely to be available in the near future, the manner in which it could be accessed and the nature of the support available. As a final step in each visit, the study team undertook a brief presentation to the Director of findings and preliminary conclusions.

Shortly after the first Center visit, the study team was offered an opportunity to present its general approach to the Directors who were meeting in Cali, Colombia. Accepting this invitation, the study team invited comments and suggestions from the Directors and, on the basis of these, incorporated certain modifications into the work program. While the Directors expressed interest in having the study explore both the management reporting and the computer capability requirements, it was apparent that their principal concern was with the identification of the need for and the availability of computing capacity to support scientific requirements, and the development of an approach to mechanization in this area. Furthermore, since some progress towards common reporting already had been made, the Directors suggested that an examination of the underlying administrative practices and procedures which would support the development of good reporting practices would be more valuable than simply an examination of the management reporting practices themselves. The incorporation of these suggestions, while not altering the overall study approach, did impact upon certain detailed tasks which then were modified accordingly.

Upon completion of the Center visits, the final phase of the study - Reporting - was begun. This work was concerned with consolidating and assessing all the information collected and identifying those findings, conclusions and recommendations which are common to all Centers. The results of this effort are presented in the following sections of the report. Other findings not of general interest or relevance have been incorporated into individual reports to each of the Directors, commenting on specific concerns either raised by the Director or noted by the study team.

In reading this report, it will be noted that no attempt has been made to comment upon the nature of the research activities, the efficacy of the programs or the quality of results or personnel, since these

matters fall beyond our terms of reference as well as our professional competence. Nevertheless, every attempt has been made to examine the nature of the accounting and administrative systems which support the Centers and the question of computing needs and capabilities in the context of each Center's unique situation, so that the conclusions and recommendations presented will be both relevant and practical.

#### IV. THE ENVIRONMENT IN PERSPECTIVE

This study focuses on management accounting and reporting requirements and on the needs for computing capabilities at the international agricultural research Centers. The study team's findings and recommendations in these fields have been developed in the context of the environment in which the Centers operate. It is useful, therefore, to highlight briefly certain aspects of this environment as background for the study findings.

##### Origin of the Centers

The continuing importance of food production has led many nations in the developed world to channel substantial funds and effort into the development of improved agricultural production techniques. Operating in temperate climates and assisted by an infrastructure which provides education, a system of financial credit and a technology for distribution and storage, the developed nations have been able to satisfy virtually their total demand for food. In the lesser developed nations, however, limited funds, rapidly increasing populations, severe climatic conditions and widespread illiteracy are commonplace and the attempt to satisfy the demand for food has not met with the same success. On the assumption that proven technology from the developed world could be transmitted to the less fortunate nations, several government development agencies and philanthropic foundations have for many years supported a variety of agricultural assistance programs in the lesser developed world. Although these programs did flourish, it has been recognized more recently that the provision of bilateral technological and financial assistance was not entirely satisfactory. What was required was the development of a research capability within the lesser developed nations themselves, so that local research and training on specific food crops could be conducted. Such a capability would permit local scientists to work on the development of improved crop varieties and technologies on location, while transferring the results directly to the day-to-day production patterns of local farmers.

As a result, the concept of the international agricultural research Centers was developed to serve the needs of several underdeveloped countries facing similar agricultural production problems. The first of

these research Centers was established in 1960 and others have come into existence since that date. Over the next several years, additional Centers likely will be designated to meet particular research objectives.

### Objectives of the Research Programs

The international agricultural research Centers constitute a network for research and training devoted to the problems of agriculture in the lesser developed nations of the world. They conduct a variety of research activities that incorporate many disciplines and, though individual research programs do differ, all Centers contribute to the same basic objective of improved food production. The spectrum of their activities and research programs includes:

- \* Development and maintenance of libraries, where a Center may also have an international responsibility for a particular crop.
- \* Evaluation of economic and social factors relating to the implementation of agricultural developments undertaken.
- \* Design and development of basic farm implements tailored to the needs of the particular environment.
- \* Development of farming systems of land use appropriate to the local environment.
- \* Research into means of water conservation and utilization.
- \* Research directed towards the improvement of animal breeding.

In addition, all Centers encourage the development of strong relationships with local agencies and institutions in the agricultural field. This activity is very much in keeping with the objectives of the Centers, although it does place a further obligation on management to keep the Center's own research objectives foremost in mind.

## Funding and Program Management

Historically, financial and research program assistance was provided by two major sponsors - the Ford Foundation and the Rockefeller Foundation. As new sponsoring agencies began to subscribe to the concept of international agricultural research centers, it soon became apparent that a more formal structure was necessary to provide needed financial, managerial and technical support. At the same time, the growth of these research programs and the expansion of administrative and support services were combining with the impact of other external demands to create an increasingly upward pressure on budgets. Inevitably, supporting funds now are becoming even more difficult to attract in increasing amounts, and the pressures of inflation alone are a serious concern.

Consequently, the Consultative Group on International Agricultural Research (CGIAR) was created in 1971 to co-ordinate the allocation of funds to the Centers and to ensure that a sufficient level of financial support was forthcoming from donors. Additionally, a Technical Advisory Committee (TAC) was established to advise the Consultative Group on the priorities of agricultural research, to evaluate existing research programs and to make recommendations on new programs. These two bodies have done much to rationalize the international agricultural research effort and improve the effectiveness of the funding process. Further progress can be expected in the future. However, the Centers find themselves increasingly subject to requests for more information on program and financial matters, as the information requirements of CG and TAC become more extensive. This study is concerned in part with helping the Centers to address these external reporting demands in an effective manner.

## Organization and Operations

Though specific functions within each of the Centers do vary, their overall organizations are essentially similar in structure. Each organization has evolved in response to local needs and to accommodate changes which have taken place. Each Center has a Director, supported by a team of senior staff members whose number varies among the Centers. Most senior staff members come from countries other than the



host country. As a minimum, the Director usually will select two key staff members, one to be responsible for Administration and one for Research. Administration typically includes accounting, purchasing, stores, personnel, self-sustaining activities and other non-research supporting operations. Research is concerned with general direction of the scientific programs of the Center. More recently, some of the Centers have appointed a third senior staff member to manage the growing outreach and special project activities.

Efficient operating systems are required to support the physical facilities. Similarly, the services required to support the research operations, to provide housing to the trainees and numerous visitors and to operate motor pools all must be well organized and adequately staffed. Furthermore, the administrative functions such as accounting, purchasing, and personnel require professional skills to develop effective control and reporting practices, to ensure an adequacy of supplies and materials and to attract the skilled human resources necessary to keep the Centers functioning.

The organization and administration of these Centers are becoming increasingly complex and the Centers are finding it increasingly difficult to locate suitably experienced staff. Compounding this problem is the objective of encouraging the introduction of regional personnel into senior administrative positions. This is proving to be a slow process in view of the lower level of experience generally possessed by those regional personnel available to the Centers. Despite these similarities, however, a number of differences can be found in the operations of the individual Centers. Staff complements vary in size from less than 100 to over 600. Moreover, each Center is located in a different region of the developing world and each is governed by its own Board of Trustees. The locations of the Centers, each of which has been carefully selected, expose scientists to a wide range of social, economic, language and climatic conditions. The degree of isolation of the Center from the local environment varies from country to country. The laws of the host country governing minimum wages and employment practices vary, with consequent impact on both the cost of operations and personnel policies. The range of individual research programs can influence the particular assignment of management and administrative responsibilities. Finally, the variety of management styles and of both senior management and of the Boards of Trustees shape particular organizational and reporting relationships.

### Key Management Concerns

The social, economic and climatic conditions in which the Centers operate make it somewhat more difficult to attract scientists to the Centers. The scientist dedicated to his research may not consider location a critical issue. But to his family, the social and personal adjustments required usually are somewhat more difficult to accept. Consequently, these real conditions oblige the Centers to provide as many comforts as possible, and this policy often places the Center in the awkward position of having to defend the extent of these benefits.

With respect to the research program itself, the Centers are not able to restrict their activities to their local programs, since they receive numerous requests and are expected to participate in a variety of programs outside the local environment of the Center, often in a different country. These outreach and special project activities provide a means of transferring knowledge and thus are generally consistent with the objectives of the Centers. Nevertheless, as these activities grow in proportion to the core research program, the capacity of senior scientific personnel is increasingly strained. Administrative workloads also increase as a result of specialized requirements and remote locations generally associated with these activities.

The frequency of visitors to the Centers, both scientific and other, imposes a considerable strain on the Center staff who, despite their other duties, must find the time necessary to meet with the streams of callers. Though the scientific and administrative staff accept this situation, the result is that the working day often extends well beyond what would normally be considered a busy day.

The specialized agricultural research libraries which the Centers maintain in support of their own research programs often create additional burdens for the Center. The information available in these libraries often is requested or accessed by international users and local scientists and students. Except where the Center has accepted formal responsibility for the provision of these library services, such requests represent an additional demand on staff resources which, though real, is difficult to measure and provide for in the annual budgets.

The possible benefits to be achieved through the use of computers is being examined at all the Centers. Increasing numbers of research scientists and economists are joining the Centers who are accustomed to having a computer available as a tool to assist them in their endeavours. Moreover, program support and administrative staff are looking to the computer as a device which can resolve the problems of processing information quickly and accurately. On the other hand, Centers are located in countries of the world where the range of computer equipment and services found in North America is not generally available. Moreover, the increasing use of computers in the developing countries already is outstripping the capability to supply adequately experienced staff to support computer usage. This study is concerned in part with helping the Centers to develop strategies to meet their requirements in this important field.

### The Future

The emerging national programs in the developing countries and the Centers' desire to contribute through the provision of resources and technology will expand, as will the need to transfer technology through training and education. The increasing inflationary problems facing donor nations and the planned growth of the Centers will place even greater constraints on the availability of supporting funds. The direction of the Centers will be influenced by the future mix of scientists with their varying backgrounds and management styles. How long a Center will exist and whether it eventually will be turned over to the host government depends in part on the development of key regional personnel. These are all relevant concerns that must be addressed in the future. But in the immediate horizon two important issues will require management attention at all the Centers - the operation of management accounting and reporting systems which satisfy both external and internal needs and the development of a practical computerization strategy which delivers the power of the computer effectively to all the Centers, whatever their environmental constraints. The following sections present our findings, conclusions and recommendations on these two key topics.

## V. MANAGEMENT ACCOUNTING AND REPORTING PRACTICES

The responsibility to provide financial information to Center management and several external agencies demands that Center reporting practices be reliable and consistent within each Center and across all Centers. To date, through the initiative and efforts of the Consultative Group, progress has been made in developing generally agreed upon budget terminology and standard financial reports. These developments are reflected in the annual budget submissions of the six international agricultural research Centers who have agreed to present to the Consultative Group similar annual statements of financial position.

These initial practices and procedures are a good starting point, avoiding many of the complexities inherent in some accounting and reporting systems. Their success to date is to be commended inasmuch as a level of uniformity in reporting has been achieved. Nonetheless, with expectations of continued growth, the investment in administrative resources and information systems is attracting considerably more attention from both the Centers and their sponsors. The quality of the content and the comparability of the information from Center to Center now is the principal focus of attention. For this reason, our review, while specifically addressing the possibilities for increased harmonization in reporting, was concerned more fundamentally with assessing the reliability of the information collection process which forms the basis for all accounting reports.

### A. FINDINGS

Management accounting and reporting responsibilities under the Center Controllers include all processing of grants, income and expenditures as well as financial statement preparation. The functions of payroll also fall within the duties of the Controller, except at CIAT and CIMMYT where they are specifically excluded. The techniques used to generate and report financial information differ from Center to Center. CIMMYT and IITA utilize computers; IRRI employs accounting posting machines; CIP, CIAT and ICRISAT rely entirely on manual systems.

The timeliness and content of the financial reporting varies from Center to Center, with only IITA currently producing a complete set of budget centre reports, an income statement and a balance sheet within five to six working days after the month end. The established Centers employ approximately the same levels of staff in their accounting departments while CIP and ICRISAT, because of their early stage of development, employ fewer. Though the physical processing and manpower characteristics differ, the primary functions and activities of each Center in supplying financial information are similar. Hence the comments which follow apply generally to all of the Centers visited.

With respect to external reporting requirements and the accounting process, both the Centers and the donors have every reason to be concerned about the quality, reliability and comparability of the information reported. In the first instance, the basis of collecting financial information differs among the Centers, as does the application of financial accounting policies and practices. While most financial officers at the Centers expressed a desire to have these matters clarified, it should be noted that commonality of financial and administrative reporting has not been a major concern to the Centers. In addition, the information reported to the Consultative Group or to special project sponsors frequently is not readily available in a convenient form from the financial records and is subject to special reporting practices.

Accounting responsibilities, procedures and information flows generally are neither detailed nor documented. Similarly, supporting systems that sustain the accounting records lack evidence of formal definition, having evolved as required to meet immediate needs. Indeed, the administrative support functions common to all the Centers differ markedly in operation. These include purchasing, inventory, payroll, self-sustaining activities and auxiliary service operations. It should not be concluded that the accounting processes themselves are unsound nor that the personnel are incompetent. Rather, the pattern of growth of the accounting and reporting systems in the Centers has been reactive and individual, so that the resulting content of accounting information provided the supporting systems makes comparability among the Centers virtually impossible.

With respect to internal reporting, the extent and content of internal financial reports available to managers varies considerably among the Centers. While internal reporting is essentially a monthly or quarterly report of actual expenses against budget by budget centre, in some cases these reports reflect the expenditures of the complete budget centre

while in others only selected categories of expenditure are reported. At the same time, program leaders, managers of support services and auxiliary service operations are becoming increasingly concerned with the management of their costs and their demands for financial information are increasing. Already, several requests for additional information have been expressed. These range from the elementary request of a budget centre wishing to know the extent of budget dollars remaining after deduction of actual expenditures and outstanding purchases to the more complex reporting requirements of a program leader or Center Director searching for the total actual plus committed expenditures of a research thrust crossing several budget centres. These internal requests for management and financial information are not being satisfied fully by existing cost collection and reporting systems and managers and program leaders are depending on private reporting systems to meet their needs. These information demands will expand and must be satisfied. In the majority of cases they remain unsatisfied not from a lack of desire to provide the information but rather from the inability of the system to meet these requests.

With respect to administrative support systems, physical inventory management and record maintenance generally are not operating to the satisfaction of Center management. The very nature of the research activities, the geographical location of the Centers and the scope of activities all impose constraints on the variety and quantity of consumable supplies required to maintain continuity of operations. Investment in physical inventory varies among the Centers but the frequency of shortages, the extent of pilferage, and the amount of annual write-offs are of concern to all Center management. Apart from the operating difficulties which these system deficiencies present, their inadequacy adversely affects the reliability of accounting information.

Another aspect of purchasing causing concern relates to the complexities of purchasing goods from abroad. Without exception the level of inventory carried by a Center is dependent upon its proximity to the source of supply. The further this distance, the greater the investment in inventory. Primary sources of supply frequently are located in foreign countries so that the time lag from the placing of an order through confirmation and shipment, clearing customs and final receipt can take at the best of times approximately six months. These delays are disruptive to the research activity and cumbersome to the administrative routine. Nevertheless, much of this foreign purchasing

is unavoidable and substantial cost savings also can be achieved on many items. Improved foreign purchasing practices and procedures could relieve many of the difficulties currently being encountered, while ensuring the continued cost benefits to the Centers.

One feature of all the Centers visited was the competence of those individuals charged with the responsibility of managing the complex financial and accounting activities. This is fortunate, since in a sophisticated research environment the key resource is personnel. The Controllers have done well in establishing accounting practices and procedures and adapting to the reporting requirements developed by the Consultative Group, particularly since all Controllers, with the exception of one, have been with their respective Centers for less than two years. However, Center Controllers have had little opportunity to meet and discuss their common and unique problems and all Controllers indicated a desire to meet with their counterparts for this purpose. In view of the importance of the financial management function and the increasing external requirements for commonality of reporting, such dialogue would be helpful indeed.

To compound this absence of dialogue, several of the Centers have experienced turnover in their financial support staff. Irrespective of the reasons, financial officers have been faced with the often difficult and certainly time consuming task of attracting and indoctrinating replacement staff. As a result, the requirements in supervision have increased and the time available to plan, administer, and evaluate results has diminished. Only a portion of their time has been devoted to the development and refinement of existing supporting administrative systems and training and development of financial support personnel is limited. Unless appropriate action is taken, these difficulties and constraints will increase to even more serious levels.

## B. CONCLUSIONS

As a result of these findings, several important conclusions can be drawn. In the first place, although all Centers are attempting to improve the quality of reported financial information, they have not achieved commonality in content. A common framework for the collection of costs would contribute appreciably to a uniform interpretation and understanding of reported results and budgets. Indeed, harmonization of reporting to external agencies can never really be achieved unless the substance of the information is homogeneous.

Secondly, in pursuing the objective of commonality in content, emphasis should be placed not on the reporting but rather on the underlying collection processes and accounting policies employed. If the information generated from the accounting system is to be useful, consistency in the application of accounting policies and practices is essential. Within any given Center, adherence to well conceived accounting policies can offer reliability and consistency over a period of time. Similarly, uniform adoption of such policies across several Centers can provide the same benefits. Local environments and unique circumstances make it impossible to achieve uniformity among the Centers on all accounting policies. However, consistency in the application of major accounting policies and practices can be achieved. For example, agreement on the method of recording of expenditures (either on a cash basis or on an accrual basis) is one area where uniformity of application is possible. Other accounting policy matters of concern and common to all Centers are:

- \* donor and other receivable recording policies
- \* inventory valuation and related policies
- \* fixed asset valuation and recording policies
- \* liability recording policies
- \* overhead calculation policies
- \* freight allocation policies
- \* distribution of support service costs policies
- \* income recording policies
- \* surplus and deficit policies
- \* currency translation policies

Thirdly, the steps taken to clarify basic collection processes and underlying accounting policies and practices will have benefits in terms of satisfying internal reporting requirements as well. In the same way that donor agencies are concerned with the quality and reliability of the information reported, so are program managers, Controllers and Center Directors. It is important that the information reported internally be equally as credible as that developed for external purposes. As requests for a variety of internal reports and information grow, it is essential that the basis of collection be firmly established and understood. Since only one set of accounting policies is necessary, steps taken to clarify accounting practices to support external reporting will pay dividends internally as well.



Fourthly, two primary systems, foreign purchases and inventory control, are significantly deficient and their importance warrants immediate attention to their improvement. Their significance to the operations and their interrelationship already have attracted the attention of Center managers. While the function of purchasing must be structured to the individual needs of each Center, all Centers are involved in substantial purchasing from abroad. Because foreign purchases are duty free, they offer a cost advantage which represents a significant portion of the total purchasing activity. Moreover, as a result of the long delivery times, foreign purchase orders often are reflected as outstanding commitments on the Center's financial statements, thereby reducing the availability of budget funds for other expenditures. A common approach to handling foreign purchasing activities clearly would lead to a lessening of some of the difficulties experienced by individual Centers. Moreover, the maintenance of an adequate supply of materials to ensure the on-going operations of the Center demands that the methods employed for the physical control and proper recording of inventory movement be thoughtfully defined. Furthermore, since effective inventory valuation and control procedures are essential to ensure that investment is properly reflected in the financial records of the Centers, their development on a common basis would be desirable.

Fifthly, a number of improvements are required to other administrative and operating systems but these are of lower priority. It is true that self-sustaining operations, physical plant services, buildings and ground services and motor pool operations do feed information through to the accounting records. In addition, these areas have their own requirements for information to assist in effective management. However, the different operating environment of each Center suggests that improvements might best be achieved on an individual Center basis and that no significant advantages are likely to accrue through common development of these secondary systems. Furthermore, these systems are not causing serious operating difficulties and their impact on other information systems such as accounting are less significant, so that it is appropriate to assign to them a lower priority for improvement at this time.

Finally, the question of accounting personnel is and will continue to be a serious concern for all Centers, quite apart from the accounting system and practices themselves. The level of skill of accounting and other administrative support staff varies substantially from Center to Center. In some cases adequate resources are readily available, while in others extreme difficulties are experienced in attracting even a minimally qualified staff. As a result, considerable management time

is devoted to supervising support personnel and the personal development of the staff continues to take second place to the day-to-day demands. More adequate training and development of support staff is essential if the current level of day-to-day supervision is to be reduced in the future.

### C. RECOMMENDATIONS

On the basis of our findings and conclusions, the study team presents five recommendations with respect to management accounting and reporting:

- \* The Centers should develop a common framework for their charts of accounts. Conceptually, the major classifications should be uniform while the detailed accounts should be structured to satisfy the individual requirements of each Center.

The development of effective reporting systems capable of providing comparable management information across all Centers depends upon the existence of a common framework for collection and classification. Without such a framework, confidence in the quality and content of the information reported, irrespective of whether it is distributed internally or externally, will remain illusive. This is not to suggest that each Center must adopt processes of accounting which are identical in all respects; given their respective operating environments, this clearly would not work. However, the Centers must develop an agreed framework within which administrative and supporting systems can evolve to satisfy both the individual and unique requirements of each Center and the common external requirements. Though each will have individual needs for variant operating and administrative procedures, a uniform framework can be constructed which will permit the necessary tailoring to meet individual Center needs. Appendix A presents a concept of a chart of accounts which may be useful as a starting point in this regard.

A number of benefits will accrue from such a common framework. Consistency of application will promote a common interpretation of results. In addition, harmonization of collection and classification methods will give evidence of effective control and suggest a level of uniformity in reporting and interpretation which will rest well with donor agencies. Furthermore, with a uniform framework in place, individual

Centers can make modifications to meet emerging requirements without affecting the overall interpretation of results. Finally, individual flexibility within common structures will permit systems development to proceed independently across the Centers.

- \* The Centers should identify, develop, and document accounting policies and practices which can be applied uniformly across the Centers.

Once a common framework has been developed to ensure that Center management and donor agencies understand the information reported, it is essential that they be assured of its reliability. This requires that financial policies and practices to be applied to all Centers be identified and defined. The Consultative Group's initial Accounting and Budgeting Practices and Procedures will require further clarification as part of this process. Common accounting policies will contribute to a consistent interpretation of reported information. Once both the classification of information and the underlying accounting policies are applied uniformly across the Centers, the concerns related to the reliability of the accounting reports can be expected to diminish. The financial policies listed previously in this section are not intended to be an exhaustive list but they will, if defined and uniformly adopted, be most useful in moving towards common information reporting.

- \* The Centers should develop common approaches to operating and managing the primary supporting systems for foreign purchasing and inventory control.

Though it might appear desirable to have all Centers employing similar administrative and operating systems, realistically this can never be achieved. The different characteristics of each Center and the different personnel involved both play a significant role in shaping the number and sophistication of administrative and operating systems in use in each Center. Nevertheless, there are opportunities where a common approach to similar functional activities can be beneficial. The foreign purchasing and the inventory control functions are of this type.

The purchasing function serves both local purchases and foreign purchases. The procedures adopted for local purchases normally are not complicated and reflect the peculiarities of the local environment. These characteristics will vary from Center to Center and should be

addressed individually. On the other hand, all Centers are concerned with the complexities involved in purchasing from abroad. Each experiences lengthy delivery times, problems of confirmation, and difficulty in determining and reporting the status of outstanding orders. In addition, foreign purchases usually involve the assistance of foreign agents and always present problems of local customs and clearance. To be able to process these foreign orders and minimize these complexities, to satisfy the queries of the requisitioners, and to reflect accurately the level of outstanding commitments demands that the foreign purchasing system be clearly defined. Moreover, though the materials purchased may differ, the problems of processing are common to all Centers, so that a collective effort to define the important processes can and should be undertaken. We would anticipate that such a common approach will go a long way to satisfying individual commitment reporting requirements and to resolving the numerous queries from requisitioners as well.

Similarly, the management and physical control of inventories lend themselves to a common approach in all the Centers. Clarification of procedures for physical control recording of receipts and issues, valuation and reporting will contribute to smoother operations and a better understanding of inventory costs charged to the operating departments and research programs. Once confidence in the inventory records is established, meaningful minimum balances and re-order quantities can be developed and introduced. Besides relieving the scientist from the need to monitor the balances of essential supplies, this further element of inventory management can reduce substantially the frequency with which orders are placed, thereby contributing to a reduction in administrative effort and costs.

- \* The Centers must address collectively the question of training and development of administrative support staff, although this training should be undertaken on an individual Center basis.

In conjunction with the systems development activities recommended above, each Center should undertake a program to provide adequate training to the financial and administrative staff. Training in the understanding of the administrative and financial systems will assist in ensuring compliance with the policies and practices to be employed. Training in the management of these specific functions not only will contribute to the personal development of the employee but also will

lessen his dependence on senior management for assistance and supervision. Employee confidence in the performance of duties is essential if further system refinement is to be undertaken.

This kind of training activity requires the senior managers in administration and accounting to identify those functional areas within their organizations where training would yield the greatest benefits. These areas ideally should include accounting, purchasing, inventory management and payroll. The training should not be directed towards the teaching of basic accounting or administrative management, since these topics might better be left to universities or management courses conducted outside the Center. Rather, training should focus on ensuring that supervisory staff have a sufficient understanding of their functions to enable them to make day-to-day operating decisions. Senior managers must train these individuals to understand the purpose of their duties and the specifics of how they are to be performed to satisfy the requirements of the Center. Moreover, senior managers must provide supervisory staff with the support and encouragement needed to carry out the work expected of them.

- \* The senior financial officers of the Centers should meet to define specific implementation plans for each of the above recommendations.

The introduction of common practices can only be achieved if all the Centers have an opportunity to discuss and express individual concerns. Joint approaches to the chart of accounts, to accounting policies and practices, to the development of primary supporting systems and to training activities cannot be established in isolation. Furthermore, participation by all Centers in resolving these issues will provide a sound basis for future co-operation and development. The study team believes that a meeting should be convened for these purposes as soon as practical.

#### D. APPROACH TO IMPLEMENTATION

The implementation of the management accounting and reporting recommendations presented in this section must recognize the current status of the Centers and the evolutionary patterns likely to occur over the next few years. Two Centers have been in operation for less than

two years and, while this is not a constraint, varying stages of development do exist among the Centers. Moreover, each has its own individual concerns although there are common requirements to be satisfied.

In the approaching the joint development of common accounting structures, policies and practices, a work program consisting of three phases is suggested. These phases are:

- Phase I - Organization and Start-Up
- Phase II - Work Sessions
- Phase III - Implementation

#### Phase I - Organization and Start-Up

To achieve the best results in the implementation of the project, a Project Team should be established. Each Center should appoint one senior member of the administrative staff, preferably the financial officer, to be responsible for ensuring that the Center's requirements are fully satisfied. This individual should be committed to the success of the project and should possess strong leadership skills as well as a good background in accounting and management. Once the Center participant has been selected, he should identify the individual requirements of his Center. Additionally, as part of the preliminary work that must be completed in this first phase, each Center representative should examine those accounting policies which require clarification and develop his own thoughts as to how they may best be applied. The criteria to be satisfied by the foreign purchasing and inventory control systems also must be established for each of the Centers at this point.

Once these initial activities have been accomplished the Center participants should convene their first meeting as a Project Team, inviting a representative of the Consultative Group Secretariat to participate to ensure that the concerns of donor agencies are fully addressed. Once the Project Team is convened, a Project Chairman should be selected from among the Center participants and the assignment of specific responsibilities and tasks to project members should be undertaken.

## Phase II - Work Sessions

Phase II is concerned with the actual development of the detailed chart of accounts, the accounting policies and practices and the primary systems. To achieve co-ordination of these efforts, all project team members should participate and contribute the results of their individual and preliminary efforts. Project members responsible for specific areas should ensure that any agreed developments realistically can be implemented by all Centers. Where specific ideas present difficulty, they should be highlighted clearly. With regard to the chart of accounts, existing operating and information requirements of each Center must be satisfied and information which might be required later as part of a more complete management information system, must be capable of being captured without the need for a complete redesign at some future date. All necessary accounting policies must be clearly defined, understood and accepted for implementation by each of the Centers. Similarly, the main elements of a system for foreign purchases and inventory control must be clarified and be capable of implementation at each of the Centers. Internal reporting forms and information flows may vary from Center to Center but the major control features should be similar. Furthermore, once the details and common elements have been identified and accepted, by all Centers, an overall time frame must be established for their implementation and detailed individual plans must be prepared and approved.

## Phase III - Implementation

This phase involves the implementation of all the decisions reached during the working sessions. It will be the responsibility of each project participant to implement at his respective Center the recommendations developed by the team. Reports on the progress of implementation and problems encountered during the introduction of change should be provided to the Project Team Chairman for follow-up. Through this joint effort to develop solutions to common concerns, the Centers will be encouraging a level of co-operation which is becoming increasingly more important and which will provide significant downstream benefits in the future.

\* \* \* \* \*

In summary, the above recommendations and implementation suggestions are intended to lead the Centers to improved structures and policies developed through collective action. As a result of these developments, it is anticipated that the Centers will exhibit a posture of strength opposite the donors and external agencies and will be in a position as a group to take the initiative in making necessary reporting modifications in the future. Similarly, on an individual basis, the Centers will be confident in the knowledge that their systems are collecting useful information and the Controllers will be able to satisfy the internal demands for information. Of course, these results cannot be achieved overnight, but they are well within the reach of the Centers in the intermediate future.



## VI. COMPUTING NEEDS AND CAPABILITIES

Scientists at the international agricultural research Centers frequently are responsible for maintaining and reporting large amounts of information, as in the area of the collections of genetic material for the various crops. They are involved also in performing statistical analyses of experimental data. Moreover, administrative processes at the Centers require the storing and retrieving of a variety of information. Under certain conditions where complexity is great or volumes of data are large or where speed is of the essence, the computer can be of great value for such applications. In this respect, the international agricultural research Centers are no different from typical computer users throughout the world. What makes the situation of the Centers unusual is that the computing capability available to meet these requirements and the conditions or circumstances surrounding its availability are not ideal in many respects.

In this section of our report, the study team presents its findings, conclusions, recommendations and implementation suggestions concerning the question of computing power needs, the kinds of power desirable and available, the staff required to operate and manage the computing capability and the practices which will ensure that each Center makes maximum use of the computer power it has available, whatever its circumstances.

### A. FINDINGS

#### Applications

In assessing the requirements for a computing capability at the Centers, an examination was made of the existing and potential applications for which a computer might be used. These include research program applications, program support applications and administrative applications.

The research program applications are those which relate directly to the performance of research work. Those of particular interest to the Centers are:

- \* Design and preparation for experiments
- \* Engineering design calculations

- \* Inventory control of physical genetic material
- \* Mapping of information by geographical area displaying ecological, hydrological, fertility or land use data
- \* Modelling and simulation of problems in farming systems, watershed management or economics of farming operations
- \* Storage, analysis and retrieval of data related to experiments, surveys, animal breeding and meteorology
- \* Storage and retrieval of germ plasm data.

Program support applications are those of use to the staff who provide support services to the research programs. The applications of particular value to the Centers include:

- \* Compilation of selective circulation lists for information distribution and automatic addressing
- \* Plant maintenance control
- \* Preparation of bibliographies and retrieval of abstracts
- \* Storage and retrieval of laboratory analysis results
- \* Typesetting and test editing

The final group of applications are those which support administrative processes. Those worthy of note are:

- \* Cost collection and financial reporting
- \* Fixed asset control
- \* Inventory control
- \* Payroll preparation

The applications listed above are by no means exhaustive of the possible opportunities for computer usage at the Centers. Rather, each of these applications was identified more than once during the visits to the Centers. Of all these applications, the study team found that particular interest was expressed in the analysis of experimental and survey data using computing power and in the storage of data related to genetic material.

### Computer Power

Today a wide range of computers are manufactured which could be employed for some or all of the applications above. Desk top computers,

for example, are used for performing mathematical calculations. They require very little in the way of operating or programming skills and do not require stringent control of the temperature and humidity of the operating environment. The range of peripherals available to connect to such equipment is increasing and includes graph plotters, punched card and mark sense readers, random access storage devices, tape storage devices and high speed printers. Secondly, mini-computers, originally developed for specific purposes such as on line control systems in military and manufacturing environments, are now widely in use. Their small size, high reliability and wide range of tolerance of operating conditions have resulted in their increasing use for conventional data processing when connected to appropriate peripheral equipment. Computerized accounting machines are in use for simple administrative processes. Their restrictions relate to the need for manual input of data and their limited storage and limited output reporting capabilities. General purpose computers, the typical data processing computers, range in size from small through medium to large. These generally possess high-speed input devices, storage capability for large volumes of data and flexible report production capabilities.

In all but the most developed countries, computing capabilities are not yet available such that the user can ideally match his requirements. Desk top computers, for example, are available in the countries visited. However, not many are in use and difficulties are being encountered in obtaining adequate maintenance. Little usage of mini-computers for conventional data processing was found during the course of the study. Suppliers or their representatives were not found at all in Colombia or Nigeria. Small computers and computerized accounting machines, on the other hand, were in use and adequate maintenance appeared to be available for their operation in all the countries visited. Medium and large computers also were in use somewhere in all of the countries visited, but on a limited basis. It was found not practical in any country at this time to make computer power available by using a combination approach involving a terminal located at the Center connected to a computer at some other location. This is due to the generally poor quality of telecommunications services available. A notable exception to the comments made above on the availability of computers occurs in the case of Mexico, where large numbers of computers are in use covering most ranges and sizes.

Currently, a Center can meet its computing power needs by:

- \* Purchasing or renting a computer to be located at the Center, and providing for its own associated services such as keypunching, or by
- \* Purchasing computer time and services from an outside agency.

In the case of purchasing or renting a computer to be located in-house, all the Centers have access to equipment suppliers or their representatives for all ranges of computers, except as noted previously. However, where suppliers have only a few machines of a specific type in the country, difficulties have been experienced in maintaining a complete range of spare parts. This problem is further compounded in those countries where difficulties are experienced in moving urgent imports rapidly through customs. The alternative involving the purchasing of computer time and services is likewise available to all the Centers although, in the cases of ICRISAT and IITA, the opportunities are much more limited than for other Centers. As part of this second alternative at all the Centers, there are opportunities to access computers at other research or national institutions located within the country. While the capabilities available are not ideal in all cases, these institutions do represent sources of computer power now and for the future. Whatever the source, the utilization of purchased time presents certain problems, since:

- \* the location of the computer is not always convenient to the Center.
- \* the service provided is often unreliable due to lack of suitable staffing, computer capacity and varying priorities for processing at the computer centre.
- \* the time taken to process data at the computer centre may be too long to meet the requirements of the user.

However, the purchase of computer time and services does represent the best option available to meet many of the Centers' needs.

### Staff

In any computing environment, appropriately trained staff are necessary to perform computer hardware maintenance, to undertake

systems analysis and programming, and to handle computer operations. The requirements for maintenance, programming and operations personnel generally have been met by training local staff to support the computers in use in those countries where the Centers are located. However, more serious problems are present in all these countries with regard to the adequacy of computer systems analysis competence to assist the user in utilizing the equipment. A shortage of this kind of assistance exists throughout the world, but it is especially acute in the lesser developed countries where rapid growth in the number of installations is increasing the demand while experienced staff regularly move to more developed countries where higher salaries can be obtained and technical aspirations better satisfied. In the case of the Centers, an increasing number of their own professional staff are familiar with computer processing techniques and in many cases are knowledgeable in the use and operation of the computer. This was found to be particularly true in the cases of biometricians and economists, whose prior training appears to have brought them into greater contact with computers.

### Operations and Management

The operations function delivers the computer capability to the user. Effective operations require that basic principles in the design and operation of computer-based systems are followed. These principles include accurate and adequate documentation and adherence to defined standards for system design, programming and operation. The study team found that systems and programs at the Centers currently using computers are generally documented. In many cases, however, these require more rigour and completeness to meet acceptable levels. Recognition of the need for standards also is emerging at the various Centers. However, at this time standards have not been documented formally. The process of managing a computing capability requires that annual plans for the function be formulated and that corresponding financial requirements be incorporated into the budget. The Centers have been giving this area more serious attention recently, although greater emphasis has been placed on the budgetary aspects and much less on the plans. Annual performance reviews for the function cannot be undertaken without such plans, and, not surprisingly, the study team found that regular performance reviews of the computing function were not conducted.

## B. CONCLUSIONS

On the basis of these findings, the study team has reached several key conclusions concerning the question of computing needs and capabilities at the Centers. In the first place, the eventual requirements for computing capability at all the Centers are similar. However, there are differences in the needs of today and in the availability and suitability of resources. This situation will necessitate the development of separate plans for each Center to meet its unique situation.

Secondly, there are opportunities to assist all functional areas in the Centers through the use of computer power. However, in the light of scarce resources, primary efforts should be directed to the support of the research program with secondary emphasis on the support services and the administrative services. Analysis of the individual applications and the opportunities for common development suggest a further criterion for prioritizing applications - those applications which meet a significant need and where an opportunity exists for common development for use at all Centers. Special efforts should be made in these situations in view of the leverage which can be obtained from their development.

Thirdly, within the research program the principal area of opportunity is in the development of a system of programs for handling the storage and retrieval of the large volume of information on the germ plasm collections. This area rapidly is becoming of major significance to the Centers, in that all are involved in assembling large collections of genetic materials for specific crops. There is a demand from scientists around the world for catalogues of the material in these collections. Scientists currently spend time searching for materials possessing specific sets of characteristics; the effort required in this task can be reduced significantly by utilizing computer techniques. Indeed, both the production of current catalogues of the varieties and the performance of searches of the varieties are major problems to the scientist, which represent a major opportunity for the utilization of computer systems. The development of a capability of this nature will yield an extremely valuable tool for the International Board for Plant Genetic Resources, established by members of the CGIAR to co-ordinate the process of collection and preservation of genetic material throughout the world. The study team believes that the most cost effective approach to the development of a system of computer programs for the storage and retrieval of germ plasm information will involve a combined effort by a group on behalf of all the Centers.

Fourthly, there are several opportunities for using computer power which should be considered as second priority applications. These should be approached on an individual basis by each Center and include the following:

- \* Design of and preparation for experiments
- \* Engineering design calculations
- \* Modelling and simulation
- \* Storage, analysis and retrieval of data
- \* Storage and retrieval of laboratory analysis results

Other applications previously discussed would not impact significantly on the scientific program and should be considered of low priority at this time. It should be noted, however, that improved manual systems or alternative forms of mechanization are available and practical to meet some of these needs, such as the use of the Remac System for preparing bibliographies. With respect to the administrative functions, regular meetings of the financial staff of the Centers will provide an appropriate vehicle for the exchange of information relating to the degree of and approach to computerization being adopted by each Center in the administrative area.

Fifthly, the strategies adopted by the various Centers to obtain computer power will vary, depending on the immediate requirements and on the availability of the computer power. Exhibit 2 identifies the suitability of the various alternative types of computers for each application. Generally, the needs of all Centers would be met best by a medium to large scale computer with comprehensive libraries of prewritten computer programs. However, no individual Center currently has sufficient usage of such a machine to justify its own. Furthermore, the ability of the Center to meet its needs in some cases is limited by the availability of computer power in an appropriate form, since not all of the Centers can obtain access to such machines located at commercial service bureaux in the countries where they are located. Despite the growing use of computers in many of the countries, a general availability of computers will continue to be restricted due to limited foreign exchange by local businesses to purchase equipment from outside the country and as a result of opposition to the use of computers to perform tasks which otherwise could be carried out on a manual basis by an under-employed work force. These disparities which exist from Center to Center in the availability of computer capabilities will continue in the coming years.

# SUITABILITY OF COMPUTING ALTERNATIVES BY APPLICATION

Application Areas	Computer Equipment Suitability					Special Application Packages
	Desk Top	Mini	Accounting	Small	Medium	
<u>Research Program Applications</u>						
Design and preparation for experiments	*	Yes	*	Yes	Yes	Yes
Engineering design calculations	*	Yes	No	Yes	Yes	Yes
Inventory control of physical genetic material	*	Yes	No	Yes	Yes	Yes
Mapping of information by geographical area	*	*	No	Yes	Yes	Yes
Modelling and simulation	*	*	No	*	Yes	Yes
Storage, analysis and retrieval of data	*	*	No	*	Yes	Yes
Storage and retrieval of germ plasm data	*	*	No	*	Yes	Yes
<u>Program Support Applications</u>						
Compilation of selective circulation lists for information distribution and automatic addressing	*	Yes	*	Yes	Yes	Yes
Plant maintenance control	*	Yes	No	Yes	Yes	Yes
Preparation of bibliographies and retrieval of abstracts	*	*	No	Yes	Yes	Yes
Storage and retrieval of laboratory analysis results	*	*	No	Yes	Yes	Yes
Typesetting and text editing	No	*	No	*	Yes	Yes
<u>Administrative Applications</u>						
Cost collection and financial reporting	*	*	*	Yes	Yes	Yes
Fixed asset control	Yes	Yes	Yes	Yes	Yes	Yes
Inventory control	*	Yes	*	Yes	Yes	Yes
Payroll preparation	*	*	*	Yes	Yes	Yes

The suitability is dependent on both the sophistication of the proposed application and the particular computer configuration.

Exhibit 2



However, the use of computers by the Centers will continue to increase as the availability of suitable computers improves and as the users become more familiar with the benefits that can be obtained. In the meantime, it is likely that all Centers will develop some in-house capability for computing using some combination of the equipment types available, but excluding medium and large computers. Exhibit 3 presents the study team's assessment of the availability of computing power to the various Centers.

Sixthly, the provision of a computer capability requires that all Centers have available computer systems analysts capable of translating user requirements into delivered operational systems and programs. A shortage of systems analysis skills exists at the Centers which must be corrected if the computers are to be utilized effectively. Moreover, all Centers have a particular requirement for the skills of a biometrician who will be a significant user of the computer and who will contribute in the areas of design of experiments and the utilization of the most appropriate techniques for analysis of the data. Such skills are available only to some Centers at this time.

Finally, there is a need for strong technical management of the computer function, placing emphasis on standards and policies for the development of computer applications and their documentation. Standards must be developed for use at each Center covering the areas of systems design and development, programming and system operations. Moreover, a formal planning process is required, such as takes place in other Center operations, including the provision of adequate budget resources, and an on-going assessment of the ability of the function to meet its goals. The degree of success achieved in this function will be related directly to the level of service provided to the user. This in turn depends upon the computing power available and the ability of the systems analyst to take maximum advantage of the available power to meet the user needs.

The similarity of some potential applications for computer processing from Center to Center could present opportunities in the future for programs and systems developed at one Center to be converted for use at another. For example, the user of the same series of programs for statistical analysis of data and data storage and retrieval would provide benefits to the users if the experiences and developments could be shared. The use of general purpose, high-level programming languages such as COBOL or FORTRAN, coupled with standards for the development and documentation of systems and programs will maximize the opportunity for the conversion of such systems from one Center to another.

COMPUTER AVAILABILITY IN THE COUNTRIES WHERE CENTERS ARE LOCATED

TYPE OF COMPUTER	SERVICE BUREAUX	ACCOUNTING MACHINES	DESK-TOP	MINI	SMALL	MEDIUM	LARGE
WIDE RANGE OF U.S. PRICES FOR EQUIPMENT MANUFACTURED	Not Applicable	\$7,000 to \$55,000	\$2,000 to \$55,000	\$7,000 to \$175,000	\$40,000 to \$270,000	\$200,000 to \$1,000,000	\$800,000 to \$12,000,000 +
WIDE RANGES APPROPRIATE FOR CENTERS	See Note 1	\$25,000 to \$40,000	\$10,000 to \$35,000	\$20,000 to \$175,000	\$120,000 to \$140,000	Not Applicable	Not Applicable
POOR	Yes See Note 2	Yes	Poor	Poor	Yes	Not Applicable	Not Applicable
POOR	Yes See Note 2	Yes	Yes See Note 2	No	Yes	Not Applicable	Not Applicable
POOR	Yes	Yes	Yes	Poor	Yes	Not Applicable	Not Applicable
POOR	Poor	Yes	Poor	No	Yes	Not Applicable	Not Applicable
POOR	Poor	Yes See Note 2	Yes See Note 2	Poor	Yes	Not Applicable	Not Applicable
POOR	Yes See Note 2	Yes	Poor	Poor	Yes	Not Applicable	Not Applicable

Notes: 1. Impossible to make general statement due to variation in supplier and country.

2. Country has few installations and/or Center is in poor location.

### C. RECOMMENDATIONS

The primary thrust of the following recommendations is aimed at enabling the Centers to proceed with the difficult task of planning their computing capabilities. In preparing these recommendations the study team has taken into consideration the varying environments of each Center and the differing stages of development reached by each. At the same time, maximum advantage has been taken of the similarities that exist in the application areas.

- \* The most appropriate general strategy for the Centers in approaching the procurement of computing power is:
  1. To the extent possible utilize medium and large scale general purpose computer systems available from an outside group, and purchase desk top computers to meet statistical analysis and other related requirements.
  2. Obtain an in-house small general purpose computer or mini-computer, if the previous alternative is not practical for the Center.

In general, a computerized accounting machine should only be used to meet administrative requirements when it is the most cost effective alternative and provided that other possible needs for in-house computer power for other areas have been taken into account.

Continued attention should be given to the development and maintenance of close professional relationships with members of national research institutes located in the same country, in order that the Centers can make maximum use of any computing power available through these institutes.

The plan required by each Center for the procurement of computer power is different and each Director has received individual recommendations specific to his Center. In summary, the computer power acquisition recommendations for the Centers are as follows:

\* CIP CIP should invest approximately \$18,000 U.S. to acquire a desk top computer to satisfy statistical analysis requirements. More extensive computing power, to meet other research needs should be obtained from local service bureaus. A small general purpose or mini computer should be considered only when service bureau costs begin to exceed \$3,000 U.S. per month or if the service is unsatisfactory. Mechanization of accounting and administrative systems should not be undertaken at this time.

\*CIAT CIAT should expand its computation capability by the purchase of a second desk top computer at a cost of approximately \$18,000 U.S. Requirements of the research programs which cannot be satisfied by the desk top computer should be met by utilizing computers located at other agencies in the country. Acquisition of a computerized accounting machine, currently under consideration by CIAT, should only be undertaken after a more thorough assessment. The required steps in this assessment are outlined in the detailed recommendations provided directly to CIAT.

\*CIMMYT CIMMYT is in the process of upgrading its desk top computer capability for statistical analysis. Adequate computing power is available from outside sources to satisfy the other requirements of the Center. In the short term, accounting and administrative applications can be satisfied by the recently acquired accounting machine; however, a thorough assessment of its appropriateness should be undertaken again within eighteen months.

\*IITA IITA meets its computing requirements by renting a small general-purpose IBM 1130 computer. IBM has indicated that maintenance of this machine will be discontinued in two to three years. The essential steps required to plan for the replacement of this computer are outlined in the detailed recommendations provided directly to the Center.

- \*ICRISAT ICRISAT should purchase a desk top computer at a cost of approximately \$18,000 U.S. to satisfy statistical analysis requirements; at the same time other external sources of computing power should be used to service requirements not appropriate to this computer. In the future, if the Center cannot obtain adequate computing power from external agencies, the in-house capability should be upgraded by acquiring a small general purpose or enhanced mini-computer.
- \*IRRI IRRI should acquire a more sophisticated desk top computer to meet current statistical analysis requirements at a cost of approximately \$18,000 \$U.S., additional computing power can continue to be obtained from external agencies to meet other data processing requirements. Mechanization of accounting and administrative requirements should only be considered after improvements in the management accounting and reporting have been implemented.

- \* The Centers should make maximum use of available computing power by the provision of suitable computer support staff to the users.

Those Centers having insufficient computer systems analyst support available to them must take steps to meet the shortage. This can be done in one or more of the following ways:

- a) by training scientific staff to use the equipment available, particularly where only desk top computers are involved
- b) by recruiting the necessary staff
- c) by sub-contracting the systems and programming to outside firms

However, the Centers should obtain locally any computer operators and programmers required to meet their needs. With respect to biometrician skills, this opportunity to reinforce computer systems analyst skills should be exploited to full advantage. Centers deficient in the skills of a biometrician should assess the requirement and meet it by recruiting a biometrician to the staff or identifying sources external to the Center which can be used on a consulting basis.

- \* The Centers should include in their annual program and budget adequate provision for the planning and operations of the computing function, including the allocation of specific responsibilities for its management.

Both the function and its position in the organization should be defined and, inasmuch as the Centers already are utilizing computers to some extent, the responsibility can be allocated formally in the immediate future. The management of the computing function includes responsibility for the preparation of the program and the budget, for the adherence of applications to policies, for design, programming and operations standards, for the production of the necessary documentation and finally for obtaining adequate staff for the function.

The position of the person charged with those responsibilities will vary from Center to Center. Where the major user and coordinator of the function is already the statistics department, the head of this department could be responsible. On the other hand, where there are two major users, one in the administrative area and the other in the research area, the responsibility should be given to an Associate Director, with further delegation of these responsibilities to personnel in each area.

- \* The Centers should develop and implement policies and standards for the development and documentation of systems and programs and for operations management.

All programs and systems in regular operational use require to be documented. The documentation process should take place over the period from original design of the system to on-going operation. All Centers are in the position either of having programs utilized on a regular basis or of considering the development of them. At the present time, no Center has formal standards for documentation in the computer area. It is possible to obtain documentation standards from many sources. However, it would be most appropriate to select a particular set of standards and tailor these to the specific environment of the Centers. This work could be performed by anyone familiar with the development of such standards and with the requirements of the Centers themselves. Standards developed for use at one Center then would be equally applicable to any other Center.

- \* Immediate action on behalf of all the Centers should be taken in the area of storage and retrieval of germ plasm data. The Centers should support the establishment of a group with responsibility for the development and implementation of a series of programs capable of storing and retrieving germ plasm data in a form that would be of use to all Centers.

The requirements for such a system are in the present, although the major benefits will accrue in the longer term. Poor decisions and the development of inappropriate techniques for storage and retrieval will be costly over the long term. Moreover, the ability to make changes in the strategy and approach, once the individual systems are developed and operational, will be difficult to obtain. A united approach to the development of a general purpose program on a limited international basis could ensure the establishment of standard definitions and units of measurements associated with describing plant material and would simplify the interchange of material in computerized format. Furthermore, the development of sophisticated search techniques could be more easily justified on a joint basis.

The implementation of such a system will involve the consideration of hardware and software implications, the development of a general system concept and the provision of adequate project management to ensure its satisfactory implementation. With respect to the hardware implications, the study team believes that the execution of our previous hardware recommendations by each of the Centers will provide the computing resources necessary to support the system. The questions of software, system concept and project management will warrant careful consideration, since the level of effort and the nature of the skills required to design and implement such a system capable of general purpose usage is beyond the capability of any one Center. Accordingly, a specific approach to these matters is suggested in the implementation section of this report.

#### D. APPROACH TO IMPLEMENTATION

The first major recommendation with respect to the development of computing capability involves the evaluation and selection of equipment for purchase by the Centers. Funds must be identified and agreement

obtained on their use, following which detailed evaluation and selection processes can be undertaken. Of particular importance to the Centers in the acquisition of computing equipment are the following factors:

- \* quality of maintenance services based on vendor history
- \* cost of the various components involved in the maintenance agreement including travel and parts
- \* amount of training and technical assistance available to the user
- \* availability of back-up equipment
- \* availability of special purpose packages applicable to the users' requirements

The second major recommendation involves the development of a computer systems analyst capability at the Centers. An example of a job description for a senior systems analyst suitable to the needs of the Centers is presented in Exhibit 4. In those cases where Centers have to recruit senior computer systems analysts from abroad to assist in the formation of their computer capability, they should consider joint recruiting process to identify suitable candidates. This should lead to cost savings for the Centers.

The third major recommendation relates to the set of computer programs capable of being used for the storage and retrieval of information on germ plasm. This recommendation should be met by developing a system which can be adapted easily for use at any Center with any crop. The development and implementation of such a system over all the Centers will be a lengthy process. For this reason, criteria should be devised early such that the system developed can be expanded over the long term to meet the requirements of a comprehensive system, while enabling a more restricted version to operate in the short term (fifteen to eighteen months). It is anticipated that these criteria would constrain mainly the reporting component of such a system.

In order to proceed with the development of this genetic materials information system, a work program of four phases is suggested. These phases are:

- Phase I - Project Organization and Start-Up
- Phase II - Requirements Definition and Conceptual Design
- Phase III - Detailed Design and Development
- Phase IV - Implementation



Exhibit 4

JOB DESCRIPTION FOR A SENIOR SYSTEMS ANALYST  
AT AN INTERNATIONAL CENTER

Core Function

Provides for the delivery of the necessary computing capability to the Center including selection and provision of appropriate equipment and computing power, systems analysis, programming and operations. Provides liaison with users.

Responsibilities

- 1) Maintenance of standards for programming, systems analysis, operations and documentation.
- 2) Provision of cost estimates for proposed applications.
- 3) Evaluation of requirements for and availability of computing power.
- 4) Provision of the necessary computing power.
- 5) Provision of the resources and management for the implementation of application systems.
- 6) Provision of the necessary resources and management for the operation of systems.
- 7) Maintenance of security and back-up for files and programs.

Duties

- 1) Organizes the development and operations of systems.
- 2) Arranges for necessary computing power and ancillary services to be made available to the user.

Exhibit 4 (Cont'd.)

- 3) In conjunction with the user, arranges for systems design, programming and the production of specifications.
- 4) Selects any necessary permanent or temporary staff and resources for the function.

Interaction

All users at the Center, computer hardware suppliers, computing centres, computer personnel within and outside of the Center.

Required Knowledge and Skills

Bachelor's degree or equivalent. Aptitude in statistics and accounting. Five or more years in data processing, with experience in programming in high level languages, systems analysis, systems implementation and operations.

Salary

In the United Kingdom or Europe	4,000 pounds to 6,000 pounds
In the United States or Canada	\$17,000 to \$21,000

## Phase I - Project Organization and Start-Up

At the outset, it will be necessary to form a team capable of carrying out a project of this nature. This team would include a project manager, agronomists on a consulting basis, systems analysts, programmers and support staff. The manner in which the team will operate, its reporting relationships, its place of operation and other similar administrative matters should be clarified to the satisfaction of both the Centers and the team, before the project begins in earnest. In addition, the systems policies and standards to be used also should be agreed at this time.

## Phase II - Requirements Definition and Conceptual Design

The first major activity in the project will be the definition of the requirements to be satisfied by the system. It is anticipated that key areas of interest to the user will include capabilities which:

- \* permit the specification of input formats and data editing requirements for a particular crop
- \* provide for the detailed items of information on the crop to be stored in the computer file
- \* permit the specifications of the format and content of the reports required
- \* provide for selective searches of the file for items having certain specified characteristics

Once the requirements have been defined and documented, a conceptual design should be prepared. It is envisioned that the design would be based on the concept of a crop profile which would allow the user to adapt the system's full capability to the particular characteristics of the crop. Once the design concept has been prepared, the hardware and software constraints imposed by the existing computing capabilities of the Centers should be identified and a search for appropriate software already in existence should be undertaken. These activities will prepare the necessary groundwork for detailed design and development.

## Phase III - Detailed Design and Development

This phase includes the physical design of the system and its specification, and the programming and testing of the system. A carefully developed testing process will be carried out to ensure that the system is fully operational prior to its release.

#### Phase IV - Implementation

Implementation should be undertaken initially on a single crop at a single Center, in order to ensure that implementation problems can be resolved in a controllable environment. Subsequently, the implementation of the system would be carried to all other Centers, following which it could be made available for use by other interested groups. It should be noted that, by following the recommendations previously presented with respect to the development of computing capabilities, all of the Centers will have access to adequate computing resources to operate a free standing system of the type envisioned for this genetic materials information system. At some point, responsibility for the maintenance and on-going development of the system should be handed over to an agricultural research Center who will be interested in the continuing development of the system.

The success of this project depends in large measure on the ability of the project manager to deliver a free-standing system to the Centers within a reasonable time frame such as eighteen months. To accomplish this, a carefully developed detailed work plan should be prepared for the project and used as a management tool throughout the project's life. Appendix B presents a basic work program which may prove useful as a guideline in developing this detailed plan.

APPENDIX A

SUGGESTED FRAMEWORK

FOR

CENTERS' CHARTS OF ACCOUNTS.

## A. GENERAL STRUCTURE

A typical overall framework for the Centers' charts of accounts which each Center could tailor to its own needs is presented in this appendix. The general ledger account number would consist of a maximum of 12 digits divided into five sub-sections which would identify the following information:

<div>X</div>	Account Type
<div>XXX</div>	Account Classification
<div>XXXX</div>	Responsibility Centre
<div>X</div>	Subsidiary Type
<div>XXX</div>	Subsidiary Account

### Account Type

Purpose: To identify the major type of account, i. e. asset, liability, etc.

Structure: A one-position numeric code.

Detailed  
Format:

<u>Account Type Code</u>	<u>Description</u>
1	Assets
2	Liabilities
3	Capital Balances and Unexpended Funds
4	Grants
5	Revenues
6	Expenses

## Account Classification

Purpose: To identify the nature of each account within an account type.

Structure: A three-position numeric code.

Detailed  
Format:

<u>Account Type &amp; Code</u>		<u>Account Classification Code</u>	<u>Description</u>
Assets	1	100	Cash
		200	Accounts Receivable
		300	Inventories
		400	Fixed Assets
		900	Other Assets
Liabilities	2	100	Accounts Payable (Donors)
		200	Accounts Payable (Other)
		900	Other Liabilities
Capital Balances and Unexpended Funds	3	100	Capital Grants
		200	Operating Grants
		300	Special Projects
Grants	4	100	Capital Grants
		200	Core Operating - Restricted
		300	Core Operating - Unrestricted
		400	Special Projects
		900	Other or Unspecified
Revenues	5	100	Revolving Fund Income
		200	Interest Income
		300	Crop Sales Income
		900	Other Income
Expenses	6	100	Salaries
		200	Travel Expenses
		300	Training Expenses
		400	Supplies Expenses
		500	Administration Expenses
		600	General Program Expenses
		700	Equipment Replacement Expenses
		800	Laboratory Expenses
		900	Other Expenses

## Responsibility Centre

Purpose: To identify any unit within the organization with responsibility for the control of expenses.

Structure: A four-position numeric code.

### Detailed Format:

<u>Responsibility Centre Code</u>	<u>Description</u>
1000 - 5000	Direct Research Responsibility Centres
6000	Training
6500	Library and Documentation
7000	Support Units
7500	Administration
9000	Special Projects

The direct research responsibility centres will not be common across the Centers. However, a level of uniformity can be established if all Centers employ the series 1000-5000 for direct research responsibility centres. The balance of the responsibility centres can be established under the major responsibility centre descriptions as identified above. Detailed responsibility centres within these groupings should be established on an individual basis. With respect to the direct research responsibility centres, typical examples which illustrate how these codes should be utilized are:

<u>Institute</u>	<u>Responsibility Centre Code</u>	<u>Description</u>
CIP	1000	Potato Research
	1100	Potato Research - Pathology
	1110	Potato Research - Pathology
		- Research Contracts



<u>Institute</u>	<u>Responsibility Centre Code</u>	<u>Description</u>
CIAT	1000	Animal Sciences
	1100	Animal Sciences - Beef
	1110	Animal Sciences - Beef-Husbandry
CIMMYT	1000	Wheat
	1100	Wheat - Breadwheats
	1700	Wheat - Agronomy and Physiology
IITA	1000	Grain - Legume Improvement
	1100	Grain Legume Improvement - Biochemistry
ICRISAT	1000	Plant Sciences
	1100	Plant Sciences - Chick Peas
IRRI	1000	Rice Research
	1100	Rice Research - Agronomy
	1250	Rice Research - Agricultural Engineering

#### Subsidiary Type

Purpose:	To provide differentiation between major types of specific subsidiary information	
Structure:	A one digit numeric code	
Detailed	1	Project Subsidiary Information
Format:	2	Staff Accounts Receivable Information

#### Subsidiary Account

Purpose:	To provide a unique code for project subsidiary information or staff accounts receivable information	
Structure:	A three digit numeric code	

## B. ILLUSTRATIONS OF THE STRUCTURE

The following eight transactions, typical of Center accounting activity, have been classified in accordance with the suggested chart of accounts structure in order to illustrate the structure in an operating manner:

A Grant Pledged by the Danish Government:

1	212	XXXX	X	XXX	Accounts Receivable - Grants - Danish Government	DR.
4	312	XXXX	X	XXX	Grants - Core Unrestricted - Danish Government	CR.

A Grant Received from the World Bank:

1	101	XXXX	X	XXX	Cash - ABC Bank (U.S.)	DR.
1	220	XXXX	X	XXX	Accounts Receivable - Grants - I.B.R.D.	CR.

A Special Project Grant Received:

1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	DR.
4	401	XXXX	X	XXX	Special Project Grant	CR.

Salary Expenditure Against a Special Project:

6	100	9401	X	XXX	Salary Expense - Special Project	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

A Travel Expenditure Incurred by the Purchasing Department:

6	220	7540	X	XXX	Travel Expense - Purchasing Department	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

Income from Sale of Potatoes to an Employee:

1	250	XXXX	2	505	Staff - Accounts Receivable - Mr. X	DR.
5	310	XXXX	X	XXX	Income - Crop Sales - Potatoes	CR.

Interest Earned on Investments:

1	101	XXXX	X	XXX	Cash - ABC Bank (U.S.)	DR.
5	200	XXXX	X	XXX	Interest Income - Investments	CR.

Supplies Expense in Agricultural Engineering Related to Soil and Crop Management for Rice:

6	400	1250	X	406	Supplies	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

APPENDIX B

BASIC WORK PROGRAM

FOR

GENETIC MATERIALS

INFORMATION SYSTEM

P. G. ROSS & PARTNERS

The success of the project to develop a genetic materials information system depends in large measure on the ability of the project manager to deliver a free-standing system to the Centers within a reasonable time frame such as eighteen months. To accomplish this, a carefully developed detailed work plan should be prepared for the project and used as a management tool throughout the project's life. The following is a basic work program which may prove useful as a guidelines in developing this detailed plan.

BASIC WORK PROGRAM FOR GENETIC  
MATERIALS INFORMATION SYSTEM  
PHASE I - PROJECT ORGANIZATION AND START-UP

REFERENCE		P R O G R A M   S T E P S	P R O G R A M   S C H E D U L E																							
			In Months																							
Phase	Task		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
I	1	Select and organize project team																								
	2	Identify policies and standards for use of the team during the project																								
	3	Formalize liaison and approval procedures																								
	4	Finalize housekeeping and contractual arrangements																								

BASIC WORK PROGRAM FOR GENETIC  
MATERIALS INFORMATION SYSTEM  
PHASE II - REQUIREMENTS DEFINITION AND CONCEPTUAL DESIGN

REFERENCE	Phase Task	P R O G R A M   S T E P S	P R O G R A M   S C H E D U L E																							
			in Months																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
II	1	Specify, for all crops for which the Centers maintain genetic material, the areas and detailed elements of information to be stored in the data bank																								
	2	Specify the retrieval requirements of the system																								
	3	Prepare a conceptual design for the system																								
	4	Identify computer hardware constraints to be applied to the components of the conceptual system design																								
	5	Review other mechanized systems for storage and retrieval of genetic information																								
	6	Survey existing software systems that could be used for such a system																								
	7	Develop a statement of the conceptual functions of the proposed system																								

BASIC WORK PROGRAM FOR GENETIC  
MATERIALS INFORMATION SYSTEM  
PHASE III - DETAILED DESIGN AND DEVELOPMENT

REFERENCE		P R O G R A M   S T E P S	P R O G R A M   S C H E D U L E																							
			In Months																							
Phase	Task		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
III	1	Design the system module for input																								
	2	Design the system module for file maintenance																								
	3	Design the report production module																								
	4	Design system reports, files and inputs																								
	5	Integrate the modules and document the system design																								
	6	Prepare program specifications																								
	7	Code and test programs																								
	8	Develop systems test data																								
	9	Perform system tests																								
	10	Prepare procedures for computer operations																								
	11	Prepare user instructions																								



BASIC WORK PROGRAM FOR GENETIC  
MATERIALS INFORMATION SYSTEM  
PHASE IV - IMPLEMENTATION

REFERENCE	P R O G R A M   S T E P S	P R O G R A M   S C H E D U L E																							
		In Months																							
Phase	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
IV	1    Select crop for first implementation																								
	2    Develop profile for the crop describing input data, file information, and reporting requirements																								
	3    Develop and document all coding systems required to describe the characteristics of the selected crop																								
	4    Collect data for conversion																								
	5    Design and implement procedures for maintenance of the data base																								
	6    Identify the computer for operating the system																								
	7    Implement on the selected computer system																								

# CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

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February 12, 1975

To: Members of the CGIAR, Members of the Technical  
Advisory Committee, and Center Directors & Budget Officers

From: Executive Secretariat

Subject: Budgeting and Accounting Procedures and Practices of  
International Agricultural Research Centers

1. Participants in CGIAR meetings in 1974 will recall discussions of a paper entitled "Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers." The paper was circulated on July 11, 1974, and was document ICW/74/3 in the papers prepared for International Centers Week.
2. A new text of the paper has now been prepared to reflect the discussions of 1974, and is now circulated for information. As did the earlier version, it describes the use of funds, the preparation of budget requests, and the accounting for funds by the centers.
3. Paragraphs 19, 32, 38, 48, 52 and 53 represent amendments or additions to the July 11 draft.

BUDGETING AND ACCOUNTING PROCEDURES AND PRACTICES OF  
INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

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## Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers

1. This paper describes a common framework of budgeting and accounting procedures and practices for the international agricultural research programs supported by the Consultative Group on International Agricultural Research (CG).

2. The concepts, definitions and report formats proposed in this paper are still evolving. It is desirable that work be continued to refine and extend the statements contained in the paper.

### Section I: Definitions and Usage

#### A. Program

3. A program is defined as a set of organized activities designed to progress toward defined objectives.

4. The core program of a center or institute is a set of long-term activities designed to progress toward the center's fundamental objectives in research and training, as described in a basic statement approved by the center's governing board (which some centers refer to as their "mandate"). The hallmark of the core program, so far as content is concerned, is that it represents the initiative of the center and carries the approval of the governing board. So far as finance is concerned, the core program is funded by several donors (often eight or more).

5. The core program need not be confined to the headquarters of an institute. A core program may be carried on away from headquarters and even outside the host country, by an institute's own staff, by contract with another research organization or laboratory, or by other cooperative arrangements with national or regional institutes (sometimes called linkages, although this term seems to be obsolescent).

6. A core program may consist of a number of different activities aimed at different research questions or action targets. These activities may be referred to as programs or program elements; centers sometimes call them "thrusts." A multiple-crop center, for instance, is considered to have a program for each crop (or group of related crops) with which its activities are concerned (e.g., the Grain Legumes Improvement Program of IITA).

#### B. Special Projects

7. Special projects usually are highly specific in purpose and limited to a definite span of time. They are often financed by a single donor, and may or may not be continued or renewed when the donor's support comes to an end.

8. In contrast to the content of a core program, the content of a special project is often stipulated by the donor and/or by the client. The project usually consists, basically, of making practical use of a center's research results or its expert staff in a single country (which may or may not be the center's host country).

9. A large class of special projects is composed of outreach programs. These typically are programs of technical assistance by the personnel of an international institute to research or extension efforts in a developing country, carried out under a contract with the recipient country and financed by that country with the help of an outside donor or donors. Examples include IRRI outreach projects in Bangladesh and India, and CIMMYT's assistance to wheat programs in countries of northern Africa.

10. Another class of special projects is composed of training exercises, carried out for the benefit of trainees from a particular country or region, and financed by a donor particularly interested in that country or region. Examples are some of the training exercises carried out by CIAT with the financial support of the Inter-American Development Bank.

11. Special-project funding also is used for other purposes, for instance:

a. Urgent projects to solve an urgent problem which an international center is particularly qualified to handle and which presumably can be solved in a short time.

b. Pilot activities in which an untried concept needs to be tested before its larger application or wider funding can be proposed.

c. Short-term holding operations, pending the permanent assignment of a research problem to the international center which will have the long-term responsibility for it (i.e., sorghum research at CIMMYT which will eventually pass to ICRISAT).

12. The funds for special projects are not included in the allocations made within the framework of the Consultative Group. It often is not possible to understand the budget of a center, however, without knowledge of special project activities, and these should be adequately described in the budget presentations of the centers.

#### C. Capital Expenditures and the Capital Development Plan

13. The research institutes classify as capital those tangible assets which are not consumed in current operations: for instance, buildings, land, vehicles, equipment and furniture. In instances where it is desirable to buy a substantial part of imported items of supply in advance of actual use, a base stock inventory is established and is treated as a capital requirement.

14. Replacement of capital assets and nominal additions to them (for instance, vehicle replacements, up-graded equipment and additional library books), however, are not classed as capital items. They are considered to be running expenses and are charged to the core budget.

15. It has been a common practice for the established research centers to devote as much as 10-12 per cent of their combined core and capital budget to capital expenditures. Some institutes, however, have much larger requirements, since in their present state of evolution, many of them have yet to complete their basic physical facilities of land, buildings and equipment.

16. The plan for the creation of a center's basic physical facilities should be described in a plan or program for capital development, approved by the Board of Trustees and presented to potential donors of the Consultative Group in advance of commitments for construction or large purchases of equipment.

17. The capital development plan includes the cost of acquiring land, of construction, of equipment and furnishings, of developing land for cultivation, and of services and fees associated with these items, including fees for architects and consultants. Expenditures for the plan usually extend over a period of years and should be programmed year by year.

18. Capital expenditures obviously are of central importance to the planning and budgeting of an institute, since the capacity of the institute's facilities will have an important influence on the level of operations and running costs. These expenditures may also provide an element of flexibility in an institute's financial commitments and cash flow, since (unlike the recurring expenditures of the core program) they may be speeded up or slowed down according to the availability of funds.

19. Apart from the financing of capital purchases, most centers have or are creating funds for working capital. They are used to cover core or capital (but not special project) expenditures when cash transfers from donors lag behind commitments; and they are replenished to their original level when donor commitments are fulfilled. Center budget proposals may include provision for working capital equal to 30 days' average cash requirements for core expenditures and acquisition of capital items. Centers which, from past experience or from the terms of prospective grants, can document a greater need may include a provision for working capital up to 40 days' average cash requirements. For the purpose of calculating the amount of working capital needed, cash requirements are not considered to include funds whose flow is assured (e.g., capital grants, mentioned in paragraph 23(d) below).

20. In some circumstances (e.g., when a building program is completed), the need for working capital may decline. In such a case, the superfluous part of the fund should be transferred to income and used for the approved core and capital program.

D. Funding and the Use of Funds

21. The resources for the work of a center are provided partly in the form of grants or contracts made by donors and partly from the income of the center itself. They are applied to purposes (core, capital, special projects or other) approved in detail by the center Trustees for a specific year and (apart from special projects) accepted by the Consultative Group for that year.

22. Grants are made by donors on various terms:

(a) Some donors simply make funds available for a center within a given budget year (which for all centers is the same as the calendar year), without a particular specification of purposes for which the funds may be used. Such funds, however, usually are meant for core programs, and a center wanting to use them for any other purpose should obtain the permission of the donor.

(b) Most donors indicate that their funds may be used both for core operations and capital expenditures; and they are satisfied to let the center decide the distribution between the two.

(c) Some donors limit their funds to use in the core program of a center. If their assistance is available, at the center's discretion, for any part of the core program, such funds are customarily referred to as "unrestricted core" or "core unrestricted" grants. In other cases, funds are made available to apply to or to offset costs of, elements of the core program specified by the donor; and funds of this kind are customarily referred to as "restricted core" or "core restricted" grants.

(d) Grants limited to capital expenditures are rare, but sometimes occur, especially for the purpose of financing a capital development plan. Some donors must follow special and rather difficult procedures in order to make grants for the costs of construction, and some prefer to avoid grants of this sort altogether.

(e) Special projects are not presented to the Consultative Group for funding. Funds for this purpose are likely to be offered by, or solicited from, an individual donor interested in the type of project in question. Grants for special projects nevertheless have a relationship to the financing of a center's other activities; they should not only be adequate to pay the direct costs of the project, but should include amounts sufficient to compensate the center for any burden put on its general services and staff.

23. Grants made for a specified purpose may not be used for another purpose. For example, grants made for core operations may not be used for the capital development plan, and vice versa; nor may core and capital grants be used for special projects.

24. Apart from funds directly provided by donors, centers have other income, referred to variously as "earned income" or "special income." Earned income results from the incidental sale of animals, crops and assets, from interest earned on cash balances; and from recovery from special-project grants of a fair share of general operating costs attributable to such projects.

25. Such income is intended for use in the year in which it is earned. It may be used anywhere within the approved core or capital program (but not for special projects) of a center. It reduces by the amount of the income the amount of funding requested from donors for the year in question.

26. Centers also have income from special projects which is intended to offset core expenditures occasioned by such projects (paragraph 22(e) above). This is often referred to as "indirect income," and is treated in the same way as earned income.

27. At the end of a year, a center may have funds which it has not spent and which it has not committed or obligated for the year's activities. These are to be treated in the same way as earned income in the following year. It should be remembered, however, that some donors are not authorized to permit the carry-over of their grants from one year to the next. The carry-over of funds by a center therefore should not exceed the amount of grants it has free from such limitation unless carry-over of additional funds is specifically negotiated with as many donors as may be necessary to make up the total amount of the carry-over. The Secretariat of the Consultative Group is prepared to lend its good offices for such negotiations.

#### E. Classification of Expenditures

28. To make the annual budgets of international agricultural research institutes comparable with each other and more easily evaluated by donors, recurring expenditures are assigned by the centers to more or less standard program and activity headings. The following are commonly used:

(a) Research. This category shows the cost of study and investigation aimed at the improvement of crops, animals or agricultural systems. Separate totals are shown for each program element or thrust.

(b) Research Support (or Research Services). This item includes activities carried out in direct support of research. It shows totals for the costs of farm (or station) operations, of laboratory services, and of scientific personnel whose time may be divided on an occasional basis among two or more research activities.



(c) Conferences and Training Activities. This category includes the staff, travel, subsistence and other identifiable costs of training programs, conferences, workshops, symposia, seminars and the like. The total for training is shown as an item separate from conferences and similar activities.

(d) Library, Documentation and Information Services. This category shows the annual cost of library services, of the publication of the annual report and of technical bulletins, of translating, of printing and of various public information activities.

(e) General Administration. This item shows totals for the costs of the Board of Trustees, of the office of the Director-General, and of administrative functions such as accounting, personnel administration, and procurement.

(f) General Operations. This category shows the costs of operating and maintaining the physical plant (such as the costs of buildings and grounds maintenance, the motor pool, utilities, telecommunications, office rent, insurance, security guards and the like).

(g) Other. If money is to be allocated to a contingency fund, it is shown under this heading. In projections of expenditures in future years, allowance for price rises is shown here.

1. One center (CINMYT) shows its headquarters expenditures for special projects here. In other cases, these costs may be shown under General Administration (especially when the Director-General's office includes staff concerned with the development and supervision of outreach programs). No standard treatment of core costs attributable to outreach activities yet exists.

29. In addition, core expenditures are classified not only by individual programs and activities, but also by the kinds of services or materials paid for. These objects of expenditure include personal services, vehicle costs, staff travel and so on.

30. Capital allocations also are shown as a class of expenditure. A distinction is made between actual expenditures, on the one hand, and appropriations to working capital funds (paragraph 19 above) on the other.

F. Staffing

31. The research centers classify staff as well as expenditures, as a help to analysis of activities within a center and within the Consultative Group system as a whole.

32. Staff nomenclature varies among institutes. In general, however, the centers divide staff into three or four broad categories: (a) senior (or principal) staff, sometimes referred to as "international staff"; (b) technical and supervisory staff (often referred to simply as support staff); (c) other support staff, including clerical staff. All categories, however, refer to permanent staff, and not to seasonal or occasional employees.

33. In most cases, numbers of senior (or principal) staff are a major determinant of expenditures. They tend to influence the number of support staff required and the requirements for equipment and other facilities. Ratios of senior to other staff, however, obviously cannot be expected to be uniform among centers.

34. In most cases, the best indicators of the type of staff contained within each classification are (a) the functions performed (e.g. research team leader), (b) the method of recruitment (i.e., whether confined to the host country or extended to other countries as well), (c) qualifications (educational degrees and employment experience) and (d) level of salary paid.

35. The following lists of titles give an indication of how staff tends to be classified at the research centers. Some titles appear in more than one category, since the actual level of the posts designated by them may vary from one center to another:

Senior Staff

Director  
Senior Scientist  
Associate Scientist  
Engineer  
Controller  
Treasurer  
Executive Officer  
Visiting Scientist  
Statistician  
Librarian  
Economist  
Editor

(Technical and Supervisory) Support Staff

Research Assistant  
Research Associate  
Laboratory Assistant  
Laboratory Technician

Farm Manager  
Post Graduates  
Statistician  
Statistical Assistant  
Librarian  
Editor  
Accountant  
Administrator  
Supervisor

Clerical Staff

Secretary  
Clerk  
Accountant  
Administrative Assistant

Other Support Staff

Technician  
Mechanic  
Driver  
Laborer  
Guard  
Messenger  
Cleaner.

Section II: Programming, Budgeting and Review

36. The members of the Consultative Group and its Technical Advisory Committee meet periodically during the year for the purpose of formulating positions on research and training programs and providing finance for them. Within the annual cycle of meetings, the research institutes are responsible for providing three documents which serve (a) to set out their financial position, (b) describe their scientific programs and findings, and (c) present their proposals for future activities and expenditures.<sup>1/</sup>

37. The Center's financial position is shown in an annual report prepared by an independent auditor. The report contains a certified balance sheet showing the position of a Center at the end of its program year. Including the value of fixed assets, cash holdings and liabilities outstanding. The report also indicates what funds were received by the Center for what purposes, indicates how they were applied, and analyzes the year's expenditures as nearly as possible in terms of the kind of expenditure classification suggested in Section I:E of this paper.

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<sup>1/</sup> Subcommittee on Center Review Procedures, Report, Nov. 20, 1973.

38. Tables illustrating the presentation of these data are given in an appendix to Annex 2 of this paper. The Balance Sheet is discussed more fully in Annex 2: "Practices and Procedures Used in Accounting for Assets, Liabilities, Capital Balances and Unexpended Funds."

39. The auditor's report should be completed by May 1, and should be in the hands of the Consultative Group soon thereafter.

40. Centers commonly distributed scientific and technical information in periodic bulletins, newsletters and occasional publications. The chief single source of scientific and technical information, and the most authoritative one, is expected to be the center's Annual Report. The Report may also, of course, contain other kinds of information, such as a description of training activities, a narrative of administrative developments, and the annual balance sheet.

41. The Report, or at least those parts of it dealing with research and training, should be in the hands of the members of the Consultative Group by July 1 following the end of the program year with which it is concerned.

42. The auditor's report and the Annual Report are concerned with the year that has just passed. The Center also prepares a program and budget proposal to the Consultative Group which describes what the Center proposes to do in the year which has yet to begin.

43. The annual program and budget document is the Center's request to the Consultative Group for financing; it is written to be understood by persons who are not themselves agricultural research scientists. The document describes the work to be undertaken in the following year, as approved by the Board of Trustees. It sets out the objectives of the program and its constituent elements, particularly explains the justification for additions to the program level of the preceding year, and estimates the cost of the program and its elements in manpower and finance.

44. The document also projects annual costs for three years beyond the program year with which it is concerned. These projections may, or may not, be approved by the Trustees. They are presented for the information of, rather than acceptance by, the Consultative Group.

45. The document consists both of a textual narrative and of an appendix of standard budget tables. Other appendices are supplied when the Center desires to give special explanations of new programs or capital additions.

46. Each Center is free to adapt its narrative to suit its own character and special needs. In 1974, however, most of the established centers are following an outline somewhat as follows:

(a) The narrative opens with a brief statement of the objectives of the center or institute. The statement describes the importance of the crop or the research questions with which it is dealing, in terms, if possible, of areas of the world and numbers of people potentially affected.

(b) The second section of the narrative briefly states the amount of funds requested for the center's core and capital programs in the program year, and compares it to the funds budgeted for the previous year. The differences between the figures are analyzed; increases due to inflation are distinguished from increases due to growth in staff and program. Implications of these increases which extend beyond the program year may be briefly mentioned.

(c) A third section may deal with particularly notable advances and achievements of the Center since the previous annual program and budget document.

(d) A fourth section, at the option of the institute, deals with issues which the management and trustees wish to report to, or raise with, the Consultative Group or its Technical Advisory Committee.

(e) Then follow a number of individual sections, each dealing with one of the important and distinguishable elements of the center program, somewhat as set out in paragraph 29 above, including research, training, administration, and capital expenditures.

(f) Each section justifies or explains increases over or changes from activity of the same kind in the preceding year. In the case of each activity, the number of man-years of senior and support staff engaged in the activity is stated, and a cost figure is given for the year.

(g) In the case of the research elements of the program, each section explains the objectives and techniques of the research involved, and gives whatever indication is possible of the time horizon toward which the program is working.

(h) If the outreach activities or other special projects have any major effects on the core or capital budget, these are explained in a separate section.

(i) Finally, the paper includes a section on capital expenditures intended during the year. Whenever possible, these expenditures are justified by being directly related to program elements, as in the case of a need for additional equipment to help carry out an expanded program of work.

47. The narrative section is followed by a set of standard budget tables. In combination, they show a center's recent history of expenditures, set out requirements for the coming budget year, and project the cost of the center's activities over an additional three-year period.

48. The tables are: (I) A Summary of Costs by Major Program or Activity; (II) A Summary of Sources and Applications of Funds; (III) A Summary of Financial Data (giving essential information from the balance sheet and adding certain other information concerning sources and uses of funds); and (IV) A summary of Personnel Positions and Man-Years by Major Program or Activity. For centers whose research organizational units do not correspond to the elements of their research programs, a fifth table is included: (Ia) A Summary of Man Years and Costs by Organizational Unit.

49. Further explanations of these tables, together with illustrative formats, are given in Annex 1 of this paper.

50. Each center is asked to provide a draft of its program and budget paper to the Executive Secretariat of the Consultative Group by March 31. This intended to serve two purposes. It will enable the Secretariat to make comments on the presentation in time for them to be taken into account in the drafts prepared by center managements for final consideration by Boards of Trustees. It will also enable the Secretariat to give early notice to the Chairman and Secretariat of the Technical Advisory Committee of the Consultative Group about any points that may need special consideration by TAC before the Committee's summer meeting, usually held in July.

51. Final texts, as approved by Boards of Trustees, should be transmitted by the centers and institutes to members of the Consultative Group as soon as possible after Board action, and in any case not later than July 1. The latter date gives donor organizations a month to study the documents before International Centers Week convenes (usually at the end of July or the beginning of August) and donors make their preliminary and informal statements of intentions concerning financial support for the centers. The earlier the transmission to donors the better, since some donor offices already are beginning in June to consult their technical advisors about the merits of center programs.

52. When unforeseen circumstances lead a center to change its planned distribution of expenditures in a year for which grants already have been approved, the center will promptly furnish copies of its revised budget to the Secretariat. This budget will be accompanied by a brief statement identifying and explaining significant changes, as for example, changes which

- (a) involve a redistribution of senior posts within the departments of the center;

- (b) finance appointments to senior or support posts, or to visiting fellowships, not previously included in the program or budget;

- (c) inaugurate a previously unbudgeted activity which members of the Consultative Group will be asked to finance in succeeding years;

- (d) involve changes in capital installations which will influence the annual level of operating costs thereafter;

- (e) reflect any effect from special project activities on the level of core staffing or the level of expenditures.

The same statement should indicate whether the changes have been approved by the Board of Trustees or an appropriate committee of the Board, or have been made within some standing authorization of the Board.

53. On receipt of the revised budget and accompanying statement, the Secretariat will consider whether the changes appear to be only of routine character, or are of sufficient interest that donors should be informed about them. In the latter case, the Secretariat will obtain from the Center any clarification that appears necessary, and will circulate the Center's statement concerning changes to donors together with any Secretariat comment that seems useful.

STANDARD BUDGET TABLES

The standard budget tables appended to the narrative section of the annual program and budget document of a center are as follows:

Table I: Summary of Costs by Major Program or Activity - see format page 2 of this annex. This table shows the total cost of the center's operation broken down by major "programs" or functional headings. It also shows the principal elements of each program.

1/  
Table Ia: Summary of Man-years and Costs by Organizational Unit - see format page 3. The first section of this table shows man-years (principal and support staff) and costs for program units, and support units according to the center's organizational structure. General operating costs are also shown to balance the table with the totals shown in Table I. The second section of this table shows expenditures by major expense category (i.e. personal services costs, consultants, travel, etc.).

Table II: Summary of Sources and Application of Funds - see sample format page 4. The first section of this table shows actual and projected funds for core and special projects and breaks down funds by type of grant and major donor.

The terminology used in this table is defined in Section 1 of this paper. The application of funds section of the table shows the uses of funds for core operations, special projects, capital expenditures and unexpended balances. In cases where funds provided in one category do not equal expenditures for that category, and the difference is not accounted for by unexpended balances, a footnote should be provided which explains the difference.

Table III: Summary of Financial Data - see format on page 5. This table shows the basic financial characteristics of the center expressed in normal balance sheet terms (i.e. current assets, fixed assets, liabilities and unexpended operating and capital balances). It also shows, in highly summarized form, sources and uses of funds and staffing for core and special projects. Its purpose is to set out on one page the center's main financial characteristics.

Table IV: Positions and Man-years - see format on page 6. This table provides the number of authorized positions and manyears according to the past year's actual results, the latest estimate for the current year, and the budget projections for the next year. Positions and manyears are shown by organizational unit and staff category.

1/ To be provided only by centers whose research organizational units do not correspond to the elements of their research programs.



Table 1

Annex 1

1975 BUDGET  
SPECIAL PROJECTS BY PROGRAM AND ACTIVITY 1971-1978  
(US\$ Thousands)

Major Activities	Actual			Core Estimated Budget			Projected		
	1971	1972	1973	Orig. Bud.g/ 1974	Curr. Est.b/ 1974	Budget 1975	1976	1977	1978
1. <u>Research</u>									
Beef									
Swine									
Pine									
Corn									
Potato									
Peanut Legumes									
Tropical Root Crops									
Agric. Systems									
etc.									
Total									
2. <u>Conferences &amp; Training</u>									
Fellowships									
Workshops									
Conferences									
Symposia									
etc.									
Total									
3. <u>Library, Documentation</u>									
<u>Information Services</u>									
Library									
Documentation									
Information									
Total									
4. <u>Research Support</u>									
<u>Service Activities:</u>									
Common Lab. Services									
Station Operations									
Tractor & Equip. Pool									
etc.									
Total									
5. <u>General Administration</u>									
Board of Trustees									
Office of Director General									
Accounting									
Purchasing									
Personnel									
Other									
etc.									
Total									
6. <u>General Operating Costs</u>									
<u>Buildings &amp; Grounds</u>									
Motor Pool									
Communications									
Office Occupancy									
General Supplies									
etc.									
Total									
7. <u>All Other</u>									
Contingency									
Provision for Future									
Price Changes									
TOTAL CORE									
TOTAL SPECIAL PROJECTS <sup>c/</sup>									

a/ Slo: 1974 budget based on allocation originally approved by the Consultative Group.

b/ At the time of the 1975 Budget submission.

c/ Attach a schedule itemizing all special projects for the budget year, giving Senior Scientist Manyears and Total Cost.

Table Ia

Annex 1

1970 BUDGET  
SUMMARY OF MANYPARS AND COSTS BY ORGANIZATIONAL UNIT - 1971-1978<sup>a/</sup>  
(US\$ Thousands)

	Actual						Est. & Budget						Projected					
	1971		1972		1973		Orig. Bud. 1974 b/		Current Est. 1974 c/		1975		1976		1977		1978	
	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost
<u>Organizational Unit</u>																		
1. Program Units																		
Agric. Economic																		
Agric. Engineering																		
Agric. Production Systems																		
Animal Sciences																		
Plant Sciences																		
Library																		
Training																		
Total Operating																		
2. Research Support Units																		
Service Operations:																		
Common Lab. Services																		
Station Operations																		
Tractor & Equip. Pool																		
Labor Pool																		
etc.																		
Total																		
3. General Administration																		
Board of Trustees																		
Office of Director General																		
Accounting																		
Purchasing																		
Personnel																		
Other																		
etc.																		
Total																		
4. General Operations																		
Buildings & Grounds																		
Motor Pool																		
Communications																		
Office Occupancy																		
General Supplies																		
etc.																		
Total																		
Contingency																		
Provision for Future Price Changes																		
TOTAL CORE																		
<u>By Object of Expenditure</u>																		
Personal Services Costs																		
Consultants																		
Supplies																		
Equipment																		
Travel																		
Vehicle, Machinery & Transp.																		
Other																		
etc.																		
Total																		
Provision for Future Price Changes																		
TOTAL CORE BUDGET																		

<sup>a/</sup> Include only manypars of senior staff.

<sup>b/</sup> Show 1974 budget based on original allocations approved by the Consultative Group.

<sup>c/</sup> At the time of the 1975 Budget submission.

1975 BUDGET  
SUMMARY OF SOURCES AND APPLICATION OF FUNDS  
(US\$ thousands)

Table 11  
Annex I

SOURCES OF FUNDS	Actual			Estimate and Budget			Projected		
	1971	1972	1973	Orig. Bud. 1974 <sup>a/</sup>	Curr. Est. 1974 <sup>b/</sup>	Budget 1975	1976	1977	1978
1. Core Operations									
a. Unrestricted									
Rockefeller Foundation									
Ford Foundation									
USAID									
Unidentified sources									
Unexpended balance from previous year									
Earned income applied in year									
SUBTOTAL									
b. Restricted									
CIDA									
Kellogg									
Unexpended balance from previous year									
Less Earned income from Restricted Grants applied to Core									
Unrestricted above									
SUBTOTAL									
c. TOTAL CORE OPERATING FUNDS									
2. Capital									
Rockefeller Foundation									
IDA									
Unidentified Sources									
Unexpended balance from previous year									
Balance of Working Funds									
Earned income applied in year									
TOTAL CAPITAL FUNDS									
3. Special Projects									
IDB									
Ford Foundation									
Unexpended balances from previous year									
Less Earned income applied to Core									
Unrestricted above									
TOTAL SPECIAL PROJECT FUNDS									
4. TOTAL FUNDS									
5. Core Operations									
6. Capital									
7. Special Projects									
8. Unexpended Balances									
a) Unrestricted Core									
b) Restricted Core									
c) Capital									
d) Working Funds									
e) Special Projects									
f) Total									
9. TOTAL APPLICATIONS									

Memo:

1. Total Core Operating Funds Required
  - Less Unexpended Balances from previous year
  - Less Earned Income Applied (excluding earned income included in Core restricted grants)
  - Net Core Operating Funds Required from CG
- Total Capital Funds Required
  - Less Unexpended Balances from previous year
  - Less Balance of Working Funds from previous year
  - Less Earned Income Applied
  - Net Funds Required from CG
2. Total Funds from CG
2. Total Earned Income Acquired in current year
  - Applied to Core
  - Applied to Capital
  - Balance Carried Forward

<sup>a/</sup> Snow 1974 budget based on allocation originally approved by the Consultative Group.  
<sup>b/</sup> At the time of the 1975 Budget Submission.

1975 BUDGET  
SUMMARY FINANCIAL DATA - 1971-1975  
(US\$ Thousands)

Table III

Annex 1

	1971	1972	1973	Estimate and Budget		
				Orig. Bud. 1974 <sup>a/</sup>	Curr. Est. 1974 <sup>b/</sup>	Budget 1975
<u>Current Assets</u>						
Cash						
Receivables						
Other Receivables						
Inventories						
Prepaid Expenses						
Other Current Assets						
Total Current Assets						
<u>Fixed Assets</u>						
Revolving Fund Balances						
Operating Equipment						
Research Equipment						
Vehicles						
Furnishings & Office Equip.						
Buildings						
Land						
Other Fixed Assets						
Total Fixed Assets						
TOTAL ASSETS						
<u>Liabilities</u>						
Accounts Payable						
Payables to Donors						
Other Liabilities						
Total Liabilities						
<u>Capital Balances &amp; Unexpended Funds</u>						
Capital Grants:						
- Fully Expended						
- Unexpended						
Sub-Total						
Unexpended Operating Grants:						
- Core						
- Special Projects						
Sub-Total						
Total Capital Balances						
TOTAL LIABILITIES AND CAPITAL						
<u>Sources of Funds</u>						
Core						
Capital Funds						
Special Projects						
Earned Income						
Total						
<u>Application of Funds</u>						
Core Operations						
Capital Expenditure						
Special Projects						
Total						
UNEXPENDED BALANCES						
<u>Memo Items</u>						
Managers of Staff:						
- Core Program						
- Special Projects						
Total						

<sup>a/</sup> Show 1974 Budget based on allocation originally approved by the Consultative Group.

<sup>b/</sup> At the time of the 1975 Budget submission.

1975 BUDGET  
TABLE OF POSITIONS AND MANPOWER

Senior Staff									Support Staff								
Positions			Man-years			Scientific and Supervisory Positions			Man-years			Other Support Staff Positions			Man-years		
Act.	Est.	Bud.	Act.	Est.	Bud.	Act.	Est.	Bud.	Act.	Est.	Bud.	Act.	Est.	Bud.	Act.	Est.	Bud.
1973	1974	1975	1973	1974	1975	1973	1974	1975	1973	1974	1975	1973	1974	1975	1973	1974	1975

Operational Units

Research Depts. or Teams

Research Support

Reference and Training

Library, Documentation & Info.

General Administration

General Operations

Total

Practices and Procedures Used in  
Accounting for Assets, Liabilities,  
Capital Balances and Unexpended Funds

Accounting Procedures

1. In general, accounting procedures for agricultural research centers are designed to provide effective expenditure control and to: (a) measure resources held; (b) reflect claims on and interest in those resources; (c) measure changes in resources over time; and (d) measure the application of resources for approved programs.

2. This annex sets out the procedures currently used by centers in accounting for assets, liabilities, capital (a & b above) and in accounting for the sources and uses of funds (c & d above).

Accounting for Assets

3. Assets are broken down into two categories - current and fixed assets. Current assets are those which, in the normal course of operations, can be readily used or quickly converted to meet current operating or capital requirements. These include cash, accounts receivable from donors and others, inventory and prepaid expenses. All remaining assets are fixed and cannot under normal circumstances be used or converted to meet current operating requirements. These include the physical plant, various tangible capital assets, land and other assets representing relatively long-term investments.

Current Assets

(a) Cash

- (i) Definition - Cash is defined as actual money or instruments which are generally accepted as money and available for ordinary operating or capital needs.
- (ii) Procedure - To operate effectively centers must maintain a liquidity position consistent with normal cash flow requirements. The appropriate level of liquidity will vary from center to center, and from year to year for a given center, depending upon the disbursement pattern for a particular set of grants. Since actual cash transfers from donors frequently lag substantially behind commitments, and often do not take place until a center is well into its operating year, the Consultative Group has accepted the principal that centers should include in their budgets provision for working capital equal to 40 days average operating cash requirements.

- (iii) Valuation - All cash balances held in non-US currency should be shown on the balance sheet in US dollars converted at the year-end exchange rate. Gains and losses on currency conversion should be accounted for as an adjustment to other income.

(b) Accounts Receivable (Donors and Others)

- (i) Definition - Accounts receivable from donors represent the amount pledged in support of the Center's approved program of operations. Other receivables cover advances to staff and/or amounts due centers from miscellaneous sales.
- (ii) Procedure - Receivables from donors are recorded at the time financial commitments are made (after January 1 of each year) and drawn down as cash payments are received. The audited financial statements should show any amounts due from donors at year-end for commitments made for that year and explain any outstanding balances. In addition, the audited financial statements should include a schedule showing payment dates on all grants. The purpose of this procedure is to identify the sources of cash flow problems. Advances to staff should be identified separately from other types of receivables on the audited financial statements.
- (iii) Valuation - All receivables should be shown on the balance sheet at net realizable value.

(c) Inventories

- (i) Definition - Supplies or other items not expended at the time of purchase, such as scientific supplies, automotive parts, office equipment, and general supplies.
- (ii) Procedure - Where a center finds it necessary to purchase a substantial portion of its supplies well in advance of actual use, a base stock inventory should be established and funded by a capital grant or through an allocation of retained earnings.

In those categories of supply where the majority of stock items can be procured locally or imported without difficulty, capitalization of base stock should not be necessary. Current usage of supplies and materials should, of course, be charged against operations.

- (iii) Valuation - Regardless of which method of accounting is used for stock items, a physical inventory of supplies should be taken at year-end and included in the balance sheet under current assets. Outstanding purchase orders at year-end for items which can be identified with specific programs, and which are expenses of the year, should be treated as a current expense of the specific programs involved, rather than as year-end inventory.

(d) Prepaid Expenses

- (i) Definition - an expenditure, often recurrent, for benefits to be received in a future period. For example, prepaid rentals, insurance premiums, etc.:
- (ii) Procedure - For material amounts, centers should accrue prepayments; and
- (iii) Valuation - The balance sheet should show prepaid items at the estimated value of benefits to be received.

(e) Other Current Assets

Items which fall within the definition of current assets not specifically covered above should be classified in the balance sheet under this general heading. The balance sheet should show these assets at cost or net realizable value, whichever is lower.

Fixed Assets

(a) General

- (i) Definition - All tangible assets acquired through a capital grant.
- (ii) Procedure - Initial acquisitions purchased through a capital grant are treated as fixed assets. Individual assets over \$300.00 should be inventoried and controlled by tagging and by appropriate detailed records, combined with a periodic physical check. Items purchased from capital grants costing less than \$300.00 should be capitalized under the category, "All Other Fixed Assets".

Asset replacements and nominal additions (e.g. vehicle replacements, additional library books, kitchenware additions, etc.) should be treated as a current operating expense. The following breakdown



of fixed assets should be shown on the audited financial statements: Revolving Funds, Operating Equipment (other than vehicles), Research Equipment, Vehicles, Furnishings, Buildings, Land, and all Other Fixed Assets.

- (iii) Valuation - The basis for valuing fixed assets should be cost. If the center wishes to show the approximate book value of assets currently held, it should apply its own schedule of depreciation and indicate the depreciated value in a footnote to the balance sheet.

(b) Revolving Funds

- (i) Definition - A fund established out of retained earnings or by a capital grant for a self-sustaining activity, from which monies are continuously expended and which is replenished through a service fee or other income.
- (ii) Procedure - Auxiliary activities such as staff housing, guest housing, training dormitories, dining room, cafeteria operations, and laundry services are established as self-sustaining operations and funded through retained earnings or one-time capital grants. Enabling grants should provide for the physical assets required and an appropriate element of working capital. Revenues to cover ongoing operational costs should be generated through appropriate service fees.
- (iii) Valuation - The audited balance sheet should show the current value of all revolving funds and in addition show in an attached schedule any depletions or additions to the original capital grants.

Accounting for Liabilities

There are two aspects of liability accounting which require comment: the treatment of outstanding purchase orders at year-end (operating commitments) and payables to donors or sponsors.

- (a) Operating commitments - At year-end, centers will have a number of outstanding commitments for items purchased but not received. In order to have a fairly simple and clear-cut rule for handling outstanding commitments, it is proposed that purchase orders dated prior to December 15 be treated as current costs and shown on the balance sheet as accounts payable. Purchase orders dated after December 15 should not be accrued as expenses for the current year.

(b) Payables to donors and sponsors - in cases where donors require reimbursement of unexpended grant balances, the amounts to be reimbursed should be determined and transferred to the liability account at year-end. This liability may result in an actual cash disbursement, in cases where donors are not authorized to permit the carry over of their grants, or they may be eliminated as an offset or "pre-payment" on a new grant.

### Capital and Unexpended Balances

The operating resources and assets held by a center are financed in the form of operating grants-or contracts and capital grants. Operating grants provide funds to meet the cost of current operations and are used to carry out approved programs. Capital grants are made to enable a center to acquire or expand its basic plant, or other physical assets, to provide base stock inventory levels, to provide working capital, or to establish revolving funds for auxiliary enterprises. In accounting for grants the following practices are in use:

(a) recording the initial grant - at the time firm commitments are made by donors and sponsors a center should record a "Receivable from Donors" on its books. A corresponding entry should be made to an appropriate grant account (e.g. operating grant - core, capital grant - buildings, Capital Grant - Revolving Funds - dormitories, etc.).

(b) receipt of grants - when cash payments are received from donors, an entry should be made to reduce the "Receivable from Donor" account.

(c) disbursements - expenditures for capital items should result in a decrease in cash and an increase in fixed assets. Operational expenditures should be charged at the time of disbursements to various programs, support activity, indirect costs or special projects.

(d) closing entries -

(i) capital grants - annual expenditures for capital items, as measured by the increase in various categories of fixed assets, should be compared with the enabling capital grants. The difference between an increase in a specific fixed asset and the capital grants provided for this asset should be transferred to an unexpended capital grant account at year-end.

(ii) operating grant: core - expenditure accounts established to measure the uses of resources for core operations should be closed at year-end to an appropriate "Operating Grant: Core" account. In cases where total expenses for core operations plus any increase in current assets are less than the operating core grants, amounts to be reimbursed to donors should

be determined and transferred to the liability account, "Payable to Donors and Sponsors". Any balance remaining in the core operating account after this adjusting entry is made should be closed to an unexpended operating grant account.

### Accounting for Sources and Uses of Funds

In accounting for sources and uses of funds the objective is to properly and accurately associate various costs with programs, organizational units and specific grants. Given the rather elaborate mosaic of grants and the differing types of financial commitments made to centers the problem of properly associating costs with programs and grants could be inherently complicated unless standard practices are adopted. The following few relatively simple rules and concepts have been adopted to avoid the more difficult aspects of this accounting problem.

### Rules for Assigning Costs

At the time disbursements are made, costs are classified by objects of expenditure (personal services costs, travel, supplies, etc.) and charged either to special projects or to an organizational unit (program departments, support departments), or to a general overhead account, (utilities, general, supplies, communications, etc.). The classification of cost at the time of disbursements does not, of course, satisfy all of the centers' costing requirements. For example, it does not enable the center to measure the cost of a specific program or a program element, nor does it assign all costs to specific grants or contracts.

In order to measure the total cost of the program or program element on a consistent basis, centers should first allocate general operating costs to organizational units using as a basis of allocation the ratio of each organizational unit's regular salaries to the total cost of regular salaries for all departments, and then distribute total support department costs to programs and program elements using the ratio of each program's salary costs to the salary costs for all programs.

In assigning costs to specific grants or contracts, centers generally use the following procedures:

- (i) Special projects - individual accounts are maintained for each special project and costs directly associated with the contract are assigned to the account at the time a disbursement is made. Indirect costs for both general and specific support of special projects is "assigned" in the form of an overhead rate which when charged is accounted for as earned income.
- (ii) Restricted Core grants - are made to provide support or offset the cost of elements of the Core program as specified by the donor. Costs are associated with a restricted grant on the basis of the procedure for costing a program element as described in the paragraph above. That is, the restricted grant is charged for the direct cost of a program element plus a fair share of general operating and support department costs. Unrestricted core grants - provide for the general support of the centers core program and accordingly absorb, pro rata, all operating costs not specifically charged to restricted grants or special projects.

Appendices

1. Balance Sheet Format
2. Format of Audited Statement  
of Sources and Application of Funds

BALANCE SHEET  
December 31, 1975  
(US\$000)

	<u>1971</u>	<u>Actual</u> <u>1972</u>	<u>1973</u>	<u>Est.</u> <u>1974</u>	<u>Budget</u> <u>1975</u>
<u>Current Assets</u>					
Cash					
Receivables from Donors <u>1/</u>					
Other Receivables <u>2/</u>					
Inventories					
Prepaid Expenses					
Other Current Assets					
Total Current Assets					
<u>Fixed Assets</u>					
Revolving Fund Balances <u>3/</u>					
Operating Equipment					
Research Equipment					
Vehicles					
Furnishings & Office Equipment					
Buildings					
Land					
Other Fixed Assets					
Total Fixed Assets					
 TOTAL ASSETS					
<u>Liabilities</u>					
Accounts Payable					
Payable to Donors					
Other Liabilities					
Total Liabilities					
<u>Capital Balances &amp; Unexpended Funds</u>					
Capital Grants:					
Fully Expended					
Unexpended					
Sub-Total					
Unexpended Operating Grants:					
Core					
Special Projects					
Sub-Total					
Total Capital Balances					
 TOTAL LIABILITIES AND CAPITAL					

- 
- 1/ Provide a schedule of donor payments and note reasons for outstanding balances.  
2/ Of which XXX represents advances to employees.  
3/ Attach a schedule listing individual revolving funds and show how increase in carrying value has been financed.

STATEMENT OF SOURCES AND APPLICATION OF FUNDS  
For the Year Ending December 31, 1975  
 (US\$ Thousands)

	<u>Actual</u>		<u>Est.</u>	<u>Budget</u>
	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
<u>Sources of Funds</u>				
1. Operating Grants - Core <u>1/</u>				
(a) Unrestricted				
(b) Restricted				
Total Core				
2. Special Projects <u>1/</u>				
3. Earned Income <u>2/</u>				
4. Capital Grants				
Total Funds				
<u>Application of Funds</u>				
1. To Core Programs <u>3/</u>				
(a) Research				
Beef				
Swine				
Rice				
etc.				
Sub-Total				
(b) Research Support				
(c) Conferences & Training				
(d) Library, Documentation &				
Information Services				
(e) General Administration				
(f) General Operating Costs				
Total Core Program Costs				
2. To Special Projects				
Total Operating Costs				
3. To Capital				
Capital Expenditures:				
(a) Revolving Funds				
(b) Working Capital				
(c) Other				
Total Capital				
4. Unexpended Balances				
(a) Unrestricted Funds				
(b) Restricted Funds				
(c) Capital Grants				
(d) Special Projects				
Total Unexpended Balances				
TOTAL APPLICATION OF FUNDS				

Memorandum Section

Program Department Costs  
 Support Department Costs  
 General Operating Costs  
 Total Operating Costs

- 
- 1/ Attach schedule 1 to show funds provided and costs by individual donor.  
2/ Attach schedule 2 to show source and use of earned income for the current year.  
3/ Attach schedule 3 to show the current year breakdown between core unrestricted, core restricted and special projects.



Schedule 2: DETAILED SCHEDULE OF EARNED INCOME  
FOR THE YEAR ENDED DECEMBER 31, 1975  
(US\$ Thousands)

	<u>Approved Budget</u>	<u>Actual</u>
<u>Sources of Earned Income</u>		
Interest on Deposits		
Sale of Crops		
Sale of Assets		
Indirect Costs charged on Special Projects		
etc.		
Total		
<u>Application of Earned Income</u>		
Applied to Core Operations		
Applied to Capital		
Total		



Schedule 3. COMPARATIVE STATEMENT OF ACTUAL EXPENSES  
AND APPROVED BUDGET FOR THE YEAR ENDED DECEMBER 31, 1975  
 (US\$ Thousands)

	Core		Core		Special		Capital	
	Unrestricted		Restricted		Projects		Approved	
	Approved		Approved		Approved		Approved	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
<u>Programs</u>								
Research:								
Beef								
Swine								
Rice								
etc.								
Research Support								
Conferences & Training								
Library, Documentation								
& Info. Services								
General Administration								
General Operating								
Total								
<u>Capital</u>								
Revolving Funds								
Plant								
etc.								
Total								
<u>Analysis of Variances</u>								
Budget Surpluses:								
Transfer to Payable Donors								
Transfer to Unexpended Balance								
Transfer to Revolving Fund								
Transfer to Current Assets								
Total								
Deficits:								
Covered by Unbudgeted								
Additional Income								
Total								